



Development Document For The Proposed Effluent Limitations Guidelines And Standards For The Metal Products & Machinery Point Source Category



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For The Proposed Effluent Limitations
Guidelines and Standards
For The
Metal Products & Machinery
Point Source Category**

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December 2000

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ACKNOWLEDGMENTS AND DISCLAIMER

The Agency would like to acknowledge the contributions of Shari Barash, Mike Ebner, Marvin Rubin, Helen Jacobs, Lynne Tudor, Karen Clark, and Beverly Randolph to development of this technical document. In addition, EPA acknowledges the contribution of Eastern Research Group, Westat, Abt Associates, and Science Applications International Corporation.

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1.0 SUMMARY AND SCOPE OF THE REGULATION

Pursuant to the Clean Water Act (CWA), EPA is proposing effluent limitations guidelines and standards for the Metal Products and Machinery (MP&M) Point Source Category. This document and the administrative record for this rulemaking provide the technical basis for these effluent limitations guidelines and pretreatment standards. Direct discharging facilities discharge wastewater to a surface water (e.g., lake, river, ocean). Indirect discharging facilities discharge wastewater to a publicly owned treatment works (POTW).

Section 1.1 presents an overview of the MP&M Point Source Category. Section 1.2 describes the applicability of the MP&M proposal and how it overlaps with previously promulgated metals regulations. Section 1.3 summarizes the proposed effluent limitations guidelines and standards.

1.1 Overview of the MP&M Point Source Category

The MP&M Point Source Category includes sites that generate wastewater as a result of processing metal parts, metal products, and machinery. Although facilities in the MP&M industry produce a wide range of products, the operations performed can be described by two types of activities: manufacturing, and rebuilding/maintenance. Manufacturing is the series of unit operations necessary to produce metal products, and is generally performed in a production environment. Rebuilding/maintenance is the series of unit operations necessary to disassemble used metal products into components, replace the components or subassemblies or restore them to original function, and reassemble the metal product. These operations are intended to keep metal products in operating condition and can be performed in either a production or a non-production environment. These manufacturing and rebuilding/maintenance activities occur in industrial sectors including:

- C Aerospace;
- C Aircraft;
- C Bus and Truck;
- C Electronic Equipment;
- C Hardware;
- C Household Equipment;
- C Instruments;
- C Job Shops;
- C Mobile Industrial Equipment;
- C Motor Vehicle;
- C Office Machine;
- C Ordnance;
- C Precious Metals and Jewelry;
- C Printed Wiring Boards;
- C Railroad;
- C Ships and Boats;
- C Stationary Industrial Equipment; and

C Miscellaneous Metal Products.

EPA has identified these 18 industrial sectors in the MP&M category; these sectors manufacture, maintain and rebuild metal products under more than 200 different SIC codes. EPA does not intend to include maintenance or repair of metal parts, products, or machines that occur only as ancillary activities at facilities that it did not include in the 18 industrial sectors. EPA believes that these ancillary repair and maintenance activities would typically generate only small quantities of wastewater. As an example, EPA does not intend for the MP&M proposal to include process wastewater discharges from an on-site machine or maintenance shop at a facility engaged in the manufacture of organic chemicals when the facility operates that shop to maintain the equipment related to manufacturing their products (i.e., organic chemicals). Alternatively, since aircraft is an industrial sector that the Agency considered in developing the MP&M proposal, EPA is proposing to include process wastewater discharges from activities related to maintaining or repairing aircraft or other related (metal) equipment (e.g., deicing vehicles) at airports. EPA also intends to cover wastewater from MP&M operations related to maintenance and repair of metal products, parts, and machinery at military installations.

The MP&M industry includes almost 90,000 sites, of which an estimated 63,000 discharge process wastewater. Of the facilities discharging process wastewater, EPA estimates that 93 percent are indirect dischargers and 7 percent are direct dischargers. The Agency estimates that there are approximately 26,000 facilities that fall into one of three categories: zero discharge, non-water-using, or contract haulers.

MP&M sites perform a wide variety of process unit operations on metal parts, products or machines. In general, MP&M unit operations can be characterized as belonging to one of the following types of unit operations:

- C Assembly/disassembly operations;
- C Metal deposition operations;
- C Metal shaping operations;
- C Organic deposition operations;
- C Printed wiring board operations;
- C Surface finishing operations;
- C Surface preparation operations; and
- C Dry dock operations.

At a given MP&M site, the specific unit operations performed, and the sequence of those operations, depend on many factors, including the activity (i.e., manufacturing, rebuilding, or maintenance), industrial sector, and type of product processed. The extent to which a facility uses process water for these unit operations may vary from site to site.

EPA estimates that MP&M sites discharge approximately 120 billion gallons of process wastewater per year. This wastewater typically contains metal pollutants (e.g., cadmium, copper, chromium, iron, nickel, zinc) and total suspended solids. MP&M wastewater may also contain oil and grease, cyanide, hexavalent chromium, and organic pollutants.

EPA identified several in-process pollution prevention, recycling, and end-of-pipe treatment technologies and practices to control the discharge of pollutants from MP&M facilities. Section 8.0 presents a more comprehensive discussion of standard in-process pollution prevention, recycling, and end-of-pipe treatment technologies and practices and Section 9.0 describes the technology options that EPA analyzed for the proposed rule.

EPA estimated engineering compliance costs for each of the technology options for a set of statistically selected model sites, and then used these sites to estimate compliance costs for the entire MP&M industry. The Agency also estimated pollutant loadings and removals associated with each of the technology options. EPA used the loadings and removals to assess the effectiveness of each technology option. The Agency used the costs to estimate the financial impact on the industry of implementing the various options, including the number of potential facility closures, potential job losses and gains, and the ability of the site to finance the pollution controls (see “Economic, Environmental, and Benefits Analysis of the Proposed Metal Products & Machinery Rule” [EPA-821-B-008].) Details on the cost-effectiveness analysis can be found in the document “Cost-Effectiveness Analysis of the Proposed Effluent Limitations Guidelines and Standards for the Metal Products & Machinery Point Source Category.” [EPA-821-B-00-007]

1.2 Applicability of MP&M and Overlap with Other Effluent Guidelines

EPA has previously established effluent limitations guidelines and standards for 13 industries that may perform unit operations or process parts that are sometimes found at MP&M sites. These effluent guidelines are:

- C Electroplating (40 CFR Part 413);
- C Iron & Steel Manufacturing (40 CFR Part 420);
- C Nonferrous Metals Manufacturing (40 CFR Part 421);
- C Ferroalloy Manufacturing (40 CFR Part 424);
- C Metal Finishing (40 CFR Part 433);
- C Battery Manufacturing (40 CFR Part 461);
- C Metal Molding & Casting (40 CFR Part 464);
- C Coil Coating (40 CFR Part 465);
- C Porcelain Enameling (40 CFR Part 466);
- C Aluminum Forming (40 CFR Part 467);
- C Copper Forming (40 CFR Part 468);
- C Electrical & Electronic Components (40 CFR Part 469); and
- C Nonferrous Metals Forming & Metal Powders (40 CFR Part 471).

In 1986, the Agency reviewed coverage of these regulations and identified a significant number of metals processing facilities discharging wastewater that these 13 regulations did not cover. Based on this review, EPA performed a more detailed analysis of these unregulated sites and identified the discharge of significant amounts of pollutants. This analysis resulted in the decision to develop national limitations and standards for the “Metal Products and Machinery” (MP&M) point source category. In general, when unit operations and their associated wastewater discharges are already covered by an existing effluent guideline, they will remain covered under that effluent guideline. However, EPA is proposing to replace the existing Electroplating (40 CFR

413) and Metal Finishing (40 CFR 433) effluent guidelines with the MP&M regulations for all facilities in the Printed Wiring Board Subcategory and the Metal Finishing Job Shops Subcategory (see Section 6.0 for a discussion on subcategorization). When a facility covered by existing metals effluent guidelines (other than Electroplating or Metal Finishing) discharges wastewater from unit operations not covered under those existing metals guidelines but covered under MP&M, the facility will need to comply with both regulations.

EPA has determined that some processes regulated under the 1982 Iron and Steel Category would be more appropriately regulated under the MP&M Category. The Agency proposes to include the following steel finishing operations in the MP&M Category: cold forming and surface finishing (e.g., electroplating) of steel bar, rod, wire, pipe, or tube; hot-dip coating of steel (except for hot dip coating of steel sheets, strips, or plates); and drawing and coating of steel wire. The Agency has determined that these operations are more similar to operations performed at MP&M facilities than to operations performed at iron and steel manufacturing facilities. This proposed regulation is not covering any hot forming operations or cold forming and surface finishing operations on steel sheets, strips or plates. Such operations on steel sheets, strips, or plates will remain regulated under the Iron and Steel Point Source Category (40CFR 420). If a facility discharges wastewater from operations covered under both the Iron and Steel guideline and the MP&M guideline, the facility will need to comply with both regulations.

Table 1-1 below summarizes the coverage of industrial operations by each MP&M subcategory.

Table 1-1

Clarification of Coverage by MP&M Subcategory

Subcategory	Proposing to continue to cover under 40 CFR Part 413 (Electroplating)	Proposing to continue to cover under 40 CFR Part 433 (Metal Finishing)	Proposing to cover under 40 CFR Part 438 (Metal Products & Machinery)
General Metals	Existing facilities that are currently covered by 413 AND are indirect dischargers that introduce less than or equal to 1 million gallons per year into a POTW.	Existing facilities that are currently covered (or new facilities that would be covered) by 433 AND are indirect dischargers that introduce less than or equal to 1 million gallons per year into a POTW.	All new and existing direct dischargers in this subcategory regardless of annual wastewater discharge volume and all new and existing indirect dischargers in this subcategory with annual wastewater discharges greater than 1 million gallons per year. (See 438.10)

Table 1-1 (Continued)

Subcategory	Proposing to continue to cover under 40 CFR Part 413 (Electroplating)	Proposing to continue to cover under 40 CFR Part 433 (Metal Finishing)	Proposing to cover under 40 CFR Part 438 (Metal Products & Machinery)
Metal Finishing Job Shops	None (see non-chromium anodizing)	None (see non-chromium anodizing)	All new and existing direct and indirect discharges under this subcategory. These facilities would no longer be covered by 413 or 433. (See 438.20)
Non-Chromium Anodizers Note: <i>Facilities that perform anodizing with chromium or with the use of dichromate sealants (or commingle their non-chromium anodizing process wastewater with wastewater from other MP&M subcategories) will be covered by 40CFR 438.</i>	Existing indirect dischargers that are currently covered by 413 AND that only perform non-chromium anodizing (or do not commingle their non-chromium anodizing wastewater with other process wastewater for discharge).	New and existing indirect dischargers (not covered by 413) that only perform non-chromium anodizing (or do not commingle their non-chromium anodizing wastewater with other process wastewater for discharge).	Existing and new direct dischargers that only perform non-chromium anodizing (or do not commingle their non-chromium anodizing wastewater with other process wastewater for discharge). (See 438.30)
Printed Wiring Board (Printed Circuit Board)	None	None	All new and existing direct and indirect discharges under this subcategory. These facilities would no longer be covered by 413 or 433. (See 438.40)
Steel Forming & Finishing	N/A	N/A	All new and existing direct and indirect discharges under this subcategory as described. (See 438.50)

Table 1-1 (Continued)

Subcategory	Proposing to continue to cover under 40 CFR Part 413 (Electroplating)	Proposing to continue to cover under 40 CFR Part 433 (Metal Finishing)	Proposing to cover under 40 CFR Part 438 (Metal Products & Machinery)
Oily Wastes	N/A	N/A	All new and existing direct and indirect dischargers under this subcategory as described. (See 438.60). (This subcategory excludes new and existing indirect dischargers that introduce less than or equal to 2 MGY into a POTW. Facilities under the cutoff are not and will not be covered by national categorical regulations).
Railroad Line Maintenance	N/A	N/A	All new and existing direct dischargers under this subcategory as described. (See 438.70) There are no national categorical pretreatment standards for these facilities.
Shipbuilding Dry Docks	N/A	N/A	All new and existing direct dischargers under this subcategory as described. (See 438.80) There are no national categorical pretreatment standards for these facilities.

N/A: Not applicable.

1.3 Proposed Effluent Limitations Guidelines and Standards

The MP&M effluent guidelines apply to process wastewater discharges from existing or new industrial sites engaged in manufacturing, rebuilding, or maintenance of metal parts, products or machines to be used in one of the industrial sectors listed in Section 1.1. The effluent guidelines only cover process wastewater generated at MP&M facilities. EPA is not covering non-process wastewater which includes sanitary wastewater, non-contact cooling water, and stormwater.

Typical unit operations at MP&M facilities include any one or more of the following:

Table 1-2
Typical Unit Operations Performed at MP&M Sites

Unit Operation Name	
1. Abrasive Blasting	24. Electroplating without Chromium or Cyanide
2. Abrasive Jet Machining	25. Electropolishing
3. Acid Treatment with Chromium	26. Floor Cleaning
4. Acid Treatment without Chromium	27. Grinding
5. Alkaline Cleaning for Oil Removal	28. Heat Treating
6. Alkaline Treatment with Cyanide	29. Impact Deformation
7. Alkaline Treatment without Cyanide	30. Machining
8. Anodizing with Chromium	31. Metal Spraying
9. Anodizing without Chromium	32. Painting - Spray or Brush
10. Aqueous Degreasing	33. Painting - Immersion
11. Assembly/Disassembly	34. Plasma Arc Machining
12. Barrel Finishing	35. Polishing
13. Burnishing	36. Pressure Deformation
14. Chemical Conversion Coating without Chromium	37. Salt Bath Descaling
15. Chemical Milling	38. Soldering/Brazing
16. Chromate Conversion Coating	39. Solvent Degreasing
17. Corrosion Preventive Coating	40. Stripping (paint)
18. Electrical Discharge Machining	41. Stripping (metallic coating)
19. Electrochemical Machining	42. Testing
20. Electroless Plating	43. Thermal Cutting
21. Electrolytic Cleaning	44. Washing Finished Products
22. Electroplating with Chromium	45. Welding
23. Electroplating with Cyanide	46. Wet Air Pollution Control

Source: MP&M survey database.

Numerous sub-operations within those listed above are also included. Many of these operations frequently have associated rinses that remove materials that preceding processes deposit on the surface of the workpiece and water-discharging air pollution control devices which become contaminated with process contaminants removed from the air. EPA is including both of these wastewater flows under the scope of the regulation.

The Agency is also including wastewater discharges from non-contact, nondestructive testing performed at MP&M facilities. EPA is not covering wastewater generated from electroplating-type operations during semiconductor wafer manufacturing or wafer fabrication processes occurring in a “clean room” environment because it believes that these operations are much different than the other electroplating operations that EPA is covering by these guidelines and do not contribute significant amounts of pollutants to the wastewater discharge.

EPA is proposing to cover wastewater generated from washing vehicles only when it occurs as a preparatory step prior to performing an MP&M unit operation (e.g., prior to disassembly to perform engine maintenance or rebuilding). EPA is also proposing to cover wastewater generated from unit operations performed by drum reconditioners/refurbishers to prepare drums for reuse. EPA did not collect information with respect to MP&M operations at gasoline service stations, passenger car rental facilities, or utility trailer and recreational vehicle rental facilities; therefore, this proposed regulation does not cover process wastewater generated by maintenance and repair activities when they occur at gasoline stations or car rental facilities.

EPA is proposing to exclude facilities in the General Metals and Oily Wastes Subcategories that discharge MP&M process wastewater below a specified flow rate (one and two million gallons per year, respectively). The Agency expects that many facilities that only perform repair and maintenance activities (e.g., auto repair shops, light aircraft maintenance) will be excluded as most will fit into the applicability of either the General Metals or Oily Waste Subcategories and have process wastewater discharges below the subcategory-specific flow cutoffs. EPA is considering a higher flow cutoff (three million gallons per year) for the Oily Wastes Subcategory for the final regulation, and it solicits comment on appropriate flow cutoff levels for all subcategories in the preamble.

EPA is proposing to cover MP&M process wastewater at mixed-use facilities (i.e., any municipal, private, U.S. military or federal facility which contains both industrial and commercial/administrative buildings at which one or more industrial sites conduct MP&M operations within the facility's boundaries). The Agency is not proposing to cover wastewater from non-metal repair, maintenance or manufacturing operations at mixed use facilities such as wastewater from residential housing, schools, churches, recreational parks, shopping centers, gas stations, utility plants, and hospitals. Therefore, EPA is proposing to allow wastewater generated at different sites within a mixed use facility to be considered as separate discharges for the purpose of applying the appropriate low flow cutoff (when applicable).

EPA may divide a point source category (e.g., MP&M) into groupings called "subcategories" to provide a method for addressing variations between products, raw materials, processes, and other factors which result in distinctly different effluent characteristics. Regulation of a category by using formal subcategories provides that each subcategory has a uniform set of effluent limitations which take into account technological achievability and economic impacts unique to that subcategory. One result of grouping similar facilities into subcategories is the increased likelihood that the regulations are practicable, and it diminishes the need to address variations between facilities through a variance process. The CWA requires EPA, in developing effluent limitations guidelines and pretreatment standards, to consider a number of different subcategorization factors. (See Section 6.0 for a list of the factors considered for the proposed MP&M rule and a detailed discussion of subcategorization).

As a result of the subcategorization analysis, EPA identified 8 distinct subcategories: General Metals, Metal Finishing Job Shops, Non-Chromium Anodizing, Oily Wastes, Printed Wiring Boards, Railroad Line Maintenance, Shipbuilding Dry Docks, and Steel Forming and Finishing.

In the 1995 proposal, EPA proposed concentration-based limits for a portion of the MP&M Point Source Category with the requirement that control authorities (e.g., POTWs) implement them as mass-based limits. The Agency did not finalize that proposal and, instead, has proposed this regulation covering the entire MP&M Point Source Category. EPA proposed requiring this conversion to mass-based limits because the Agency believed that it was necessary to ensure the use of water conservation and pollution prevention practices similar to those that were part of EPA's selected option (60 FR 28230). EPA received comments on the administrative burden on POTWs associated with implementation of mass-based limits, largely due to the fact that most MP&M facilities do not collect production information on a wastestream-by-wastestream basis. EPA is again proposing concentration-based limits (for all but one subcategory--Steel Forming & Finishing); however, the Agency is no longer requiring control authorities (e.g., POTWs) or permit writers to implement the limits on a mass basis. Instead EPA authorizes control authorities and permit writers to decide when it is most appropriate to implement mass-based limits. EPA believes that this approach will reduce implementation burden on POTWs and will result in increased use of water conservation practices at the facilities where POTWs and permit writers think it is most needed.

The proposed limitations are presented in Section 14.0 for each subcategory, and Section 15.0 provides guidance to permit writers on the conversion of concentration-based limits to mass-based limits.

2.0 BACKGROUND

This section presents background information supporting the development of effluent limitations guidelines and standards for the Metal Products and Machinery (MP&M) Point Source Category. Section 2.1 presents the legal authority to regulate the MP&M industry. Section 2.2 discusses the Clean Water Act, Pollution Prevention Act, Regulatory Flexibility Act (as amended by the Small Business Regulatory Enforcement Fairness Act of 1996), and prior regulation of the MP&M industry.

2.1 Legal Authority

EPA is proposing this regulation under the authorities of Sections 301, 304, 306, 307, 308, 402 and 501 of the Clean Water Act, 33 U.S.C. Sections 1311, 1314, 1316, 1317, 1318, 1342 and 1361 and under authority of the Pollution Prevention Act of 1990 (PPA), 42 U.S.C. 13101 et seq., Pub L. 101-508, November 5, 1990.

2.2 Regulatory Background

2.2.1 Clean Water Act

Congress adopted the Clean Water Act (CWA) to "restore and maintain the chemical, physical, and biological integrity of the nation's waters" (Section 101(a), 33 U.S.C.1251(a)). EPA accomplishes this goal in part by restricting the types and amounts of pollutants discharged from various industrial, commercial, and public sources of wastewater. Direct dischargers must comply with effluent limitations in National Pollutant Discharge Elimination System ("NPDES") permits; indirect dischargers must comply with pretreatment standards for pollutants which may pass through or interfere with POTW operations. EPA establishes these limitations and standards by regulation for categories of industrial dischargers and bases them on the degree of control that can be achieved using various levels of pollution control technology. These guidelines and standards are summarized briefly below.

1. Best Practicable Control Technology Currently Available (BPT)
(Section 304(b)(1) of the CWA).

BPT effluent limitations guidelines are applicable to direct dischargers (i.e., sites that discharge wastewater to surface water). BPT effluent limitations guidelines are generally based on the average of the best existing performance by facilities of various sizes, ages, unit processes or other common characteristics within the category or subcategory for control of conventional, priority, and non-conventional pollutants.

In establishing BPT effluent limitations guidelines, EPA first considers the total cost of achieving effluent pollutant reductions in relation to the effluent pollutant reduction benefits. The agency also considers the age of equipment and facilities involved, the processes employed, process

changes required, engineering aspects of the control technologies, non-water quality environmental impacts (including energy requirements), and other factors as the Agency deems appropriate. The Agency considers the category- or subcategory-wide cost of applying the technology in relation to the effluent pollutant reduction benefits. Where existing performance is uniformly inadequate, EPA may require higher levels of control than currently in place in an industrial category if the Agency determines that the technology can be practically applied.

2. Best Available Technology Economically Achievable (BAT)
(Sections 304(b)(2)(B) of the CWA).

BAT effluent limitations guidelines are applicable to direct discharging sites. In general, BAT effluent limitations guidelines represent the best existing economically achievable performance of plants in the industrial subcategory or category. The CWA establishes BAT as the principal national means of controlling the direct discharge of priority pollutants and nonconventional pollutants to waters of the United States. The factors considered in assessing BAT include the cost of achieving BAT effluent reductions, the age of equipment and facilities involved, the processes employed, engineering aspects of the control technology, potential process changes, non-water quality environmental impacts (including energy requirements), and such factors as the Administrator deems appropriate. The Agency retains considerable discretion in assigning the weight to be accorded to these factors. An additional statutory factor considered in setting BAT is economic achievability. Generally, EPA determines the economic achievability on the basis of the total cost to the industrial subcategory and the overall effect of the rule on the industry's financial health. As with BPT, where existing performance is uniformly inadequate, EPA may base BAT upon technology transferred from a different subcategory within an industry or from another industrial category. In addition, BAT may include process changes or internal controls, even when these technologies are not common industry practice.

3. Best Conventional Pollutant Control Technology (BCT)
(Section 304(b)(4) of the CWA).

The 1977 Act included Section 301(b)(2)(E), which established BCT for discharges of conventional pollutants from existing industrial point sources. BCT effluent limitations guidelines are applicable to direct discharging sites. Section 304(a)(4) designated the following as conventional pollutants: biochemical oxygen demand (BOD₅), total suspended solids (TSS), fecal coliform, pH, and any additional pollutants defined by the Administrator as conventional. The Administrator designated oil and grease as an additional conventional pollutant on July 30, 1979 (44 FR 44501).

BCT is not an additional limitation, but replaces BAT for the control of conventional pollutants. In addition to other factors specified in Section 304(b)(4)(B), the CWA requires that EPA establish BCT limitations after consideration of a two-part "cost-reasonableness" test. EPA explained its methodology for the development of BCT limitations in 1986 (51 FR 24974, July 9, 1986).

4. New Source Performance Standards (NSPS)
(Section 306 of the CWA).

NSPS are applicable to new direct discharging sites and are based on the best available demonstrated treatment technology. New facilities have the opportunity to install the best and most efficient production processes and wastewater treatment technologies. As a result, NSPS should represent the greatest degree of effluent reduction attainable through the application of the best available demonstrated control technology for all pollutants (i.e., conventional, nonconventional, and priority pollutants). In establishing NSPS, the CWA directs EPA to take into consideration the cost of achieving the effluent pollutant reduction and any non-water quality environmental impacts (including energy requirements).

5. Pretreatment Standards for Existing Sources (PSES)
(Section 307(b) of the CWA).

PSES are applicable to indirect discharging sites (i.e., sites that discharge to a publicly owned treatment works (POTW)). The CWA requires PSES for pollutants that pass through, interfere with, or are otherwise incompatible with POTW treatment processes or sludge disposal methods. The CWA specifies that pretreatment standards are to be technology-based and analogous to the BAT effluent limitations guidelines.

The General Pretreatment Regulations, which set forth the framework for implementing categorical pretreatment standards, are found at 40 CFR Part 403. Those regulations contain a definition of pass-through that addresses local rather than national instances of pass-through and establish pretreatment standards that apply to all non-domestic dischargers (52 FR 1586, January 14, 1987).

6. Pretreatment Standards for New Sources (PSNS)
(Section 307(b) of the CWA).

PSNS are applicable to new indirect discharging sites. Like PSES, PSNS are designed to prevent the discharges of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of POTWs. PSNS are to be issued at the same time as NSPS. New indirect dischargers have the opportunity to incorporate into their plants the best available

demonstrated technologies. The Agency considers the same factors in promulgating PSNS that it considers in promulgating NSPS.

The following table summarizes these regulatory levels of control and the pollutants controlled.

Table 2-1
Summary of Regulatory Levels of Control

Type of Sites Regulated	BPT	BAT	BCT	NSPS	PSES	PSNS
Existing Direct Dischargers	X	X	X			
New Direct Dischargers				X		
Existing Indirect Dischargers					X	
New Indirect Dischargers						X
Pollutants Regulated	BPT	BAT	BCT	NSPS	PSES	PSNS
Priority Toxic Pollutants	X	X		X	X	X
Nonconventional Pollutants	X	X		X	X	X
Conventional Pollutants	X		X	X		

Source: Clean Water Act.

2.2.2 Section 304(m) Requirements

Section 304(m) of the Clean Water Act (33 U.S.C. 1314(m)), added by the Water Quality Act of 1987, requires EPA to establish schedules for (1) reviewing and revising existing effluent limitations guidelines and standards (“effluent guidelines”), and (2) promulgating new effluent guidelines. On January 2, 1990, EPA published an Effluent Guidelines Plan (55 FR 80), in which it established schedules for developing new and revised effluent guidelines for several industrial categories. In this notice, the Agency identified the Metal Products and Machinery (formerly referred to as Machinery Manufacturing and Rebuilding) Point Source Category as requiring effluent guidelines, and identified an estimated schedule for regulatory action.

The Natural Resources Defense Council, Inc. (NRDC) and Public Citizen, Inc. challenged the Effluent Guidelines Plan in a suit filed in U.S. District Court for the District of Columbia (*NRDC et al. v. Reilly*, Civ. No. 89-2980). The plaintiffs charged that EPA’s plan did not meet the requirements of Section 304(m). A Consent Decree in this litigation was entered by the Court on January 31, 1992. The terms of the Consent Decree are reflected in the Effluent Guidelines Plan published on September 8, 1992 (57 FR 41000). As a result of this decree, EPA established a plan to propose effluent guidelines for the MP&M Point Source Category. As discussed further in Section 2.2.5, EPA initially divided the industry into two phases based on industrial sector. The 1992 Effluent Guidelines Plan scheduled EPA to propose the MP&M Phase I Category by November 1994, and take final action by May 1996. EPA filed a motion with the

court on September 28, 1994, and the court granted an extension for proposal and promulgation of the final regulation.

On May 30, 1995, EPA published the MP&M Phase I proposal (60 FR 28210). EPA received a large number of public comments on the Phase I proposal requesting that the Agency combine all MP&M industrial sectors into one effluent guideline (see Section 2.2.5). Based on these comments and after negotiations with NRDC, EPA filed an unopposed motion in the U.S. District Court for the District of Columbia to modify the Consent Decree to merge the two phases of the MP&M effluent guideline and to modify the dates for proposal and final action (61 FR 35042; July 3, 1996). The court approved the motion, and the modified dates for the combined MP&M regulation are October 2000 for proposal and December 2002 for final action (62 FR 8726; February 26, 1997).

2.2.3 Pollution Prevention Act

The Pollution Prevention Act of 1990 (42 U.S.C. 13101 et seq., Pub.L. 101-508, November 5, 1990), makes pollution prevention the national policy of the United States. This act identifies an environmental management hierarchy in which pollution “should be prevented or reduced whenever feasible; pollution that cannot be prevented or recycled should be reused in an environmentally safe manner whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and disposal or release into the environment should be employed only as a last resort...” (Sec. 6602; 42 U.S.C. 13103).

According to the Pollution Prevention Act, source reduction reduces the generation and release of hazardous substances, pollutants, wastes, contaminants, or residuals at the source, usually within a process. The term source reduction “includes equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training, or inventory control. The term source reduction does not include any practice which alters the physical, chemical, or biological characteristics or the volume of a hazardous substance, pollutant, or contaminant through a process or activity which itself is not integral to or necessary for the production of a product or the providing of a service.” In effect, source reduction means reducing the amount of a pollutant that enters a waste stream or that is otherwise released into the environment prior to out-of-process recycling, treatment, or disposal. The Pollution Prevention Act directs the Agency to, among other things, “review regulations of the Agency prior and subsequent to their proposal to determine their effect on source reduction” (Sec. 6604; 42 U.S.C. 13103).

2.2.4 Regulatory Flexibility Act (RFA) as Amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA)

Under the Regulatory Flexibility Act (RFA) [5 U.S. C. 601 et seq., as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA)], EPA generally is required to conduct a regulatory flexibility analysis describing the impact of a proposed rule on small entities as part of the rulemaking. EPA conducted an initial regulatory flexibility analysis (IRFA) that examines the impact of the proposed rule on small entities, along with regulatory alternatives

that could reduce that impact. The IRFA is available for review in the MP&M Administrative Record (as chapter 10 in the Economic, Environmental and Benefits Analysis). Under section 605(b) of the RFA, if EPA certifies that a rule will not have a significant economic impact on a substantial number of small entities, EPA is not required to prepare a regulatory flexibility analysis. A regulatory flexibility analysis addresses:

- C The need for, objectives of, and legal basis for a rule.
- C A description of, and where feasible, an estimate of the number of small entities to which a rule would apply.
- C The projected reporting, recordkeeping, and other compliance requirements of a rule, including an estimate of the classes of small entities that would be subject to a rule and the types of professional skills necessary for preparation of the report or record.
- C An identification, where practicable, of all relevant federal rules that may duplicate, overlap, or conflict with a rule.
- C A description of any significant regulatory alternatives to a rule that accomplish the stated objectives of applicable statutes and that minimize any significant economic impact of a rule on small entities. Consistent with the stated objectives of the CWA, the analysis discusses significant alternatives such as:
 - Establishing differing compliance or reporting requirements or timetables that take into account the resources available to small entities.
 - Clarifying, consolidating, or simplifying of compliance and reporting requirements under the rule for such small entities.
 - Using performance rather than design standards.
 - Excluding from coverage of a rule, or any part thereof, such small entities. Based on the regulatory flexibility analysis and other factors, EPA considered an exclusion to eliminate disproportionate impacts on small businesses, which reduced the number of small businesses that would be affected by a rule.

Pursuant to the RFA as amended by SBREFA, EPA also conducted outreach to small entities and convened a Small Business Advocacy Review Panel to obtain advice and recommendations of representatives of the small entities that potentially would be subject to the rule's requirements. The Panel comprised representatives from three federal agencies: EPA, the Small Business Administration, and the Office of Management and Budget. The Panel reviewed materials EPA prepared in connection with the IRFA, and collected the advice and

recommendations of small entity representatives. For this proposed rule, the small entity representatives included nine small MP&M facility owner/operators, one small municipality, and the following six trade associations representing different sectors of the industry: National Association of Metal Finishers (NAMF)/Association of Electroplaters and Surface Finishers (AESF)/MP&M Coalition; the Association Connecting Electronics Industries (also known as IPC); Porcelain Enamel Institute; American Association of Shortline Railroads (ASLRA); Electronics Industry Association (EIA); and the American Wire Producers Association (AWPA). The Panel provided background information and analysis to the small entity representatives and conducted meetings with the representatives. The Panel asked the small entity representatives to submit written comment on the MP&M rulemaking in relation to the elements of the IRFA. The Panel carefully considered these comments when developing their recommendations. The Panel prepared a report (available in the MP&M Administrative Record) that summarizes their outreach to small entities and the comments submitted by the small entity representatives. The Panel's report also presented their findings on issues related to the elements of an IRFA and recommendations regarding the rulemaking.

2.2.5 Regulatory History of the Metals Industry

EPA has promulgated effluent limitations guidelines and standards for 13 metals industries. These regulations cover metal manufacturing, metal forming, and component finishing, as summarized below.

Table 2-2

Summary of Metals Industry Effluent Guidelines

Coverage Area	Title	CFR Reference
Metal and Metal Alloy Manufacturing	Iron and Steel Manufacturing ^a	40 CFR 420
	Nonferrous Metals Manufacturing	40 CFR 421
	Ferroalloy Manufacturing	40 CFR 424
Metal Forming	Iron and Steel Manufacturing ^a	40 CFR 420
	Metal Molding and Casting	40 CFR 464
	Aluminum Forming	40 CFR 467
	Copper Forming	40 CFR 468
	Nonferrous Metals Forming and Metal Powders	40 CFR 471
Component Finishing	Electroplating	40 CFR 413
	Iron and Steel Manufacturing ^a	40 CFR 420
	Metal Finishing	40 CFR 433
	Battery Manufacturing	40 CFR 461
	Coil Coating	40 CFR 465
	Porcelain Enameling	40 CFR 466
	Electrical and Electronic Component Manufacturing	40 CFR 469

Source: Code of Federal Regulations, Part 40.

^aThe Iron and Steel Manufacturing category includes metal manufacturing, metal forming, and component finishing.

In 1986, the Agency reviewed coverage of these 13 regulations and identified a significant number of metals processing facilities discharging wastewater that these regulations did not cover. Based on this review, EPA performed a detailed analysis of these unregulated sites and identified the discharge of significant amounts of pollutants. This analysis resulted in the formation of the Machinery Manufacturing and Rebuilding (MM&R) Point Source Category. In 1989, the Agency published a Preliminary Data Summary (PDS) for the MM&R industry, which is located in the MP&M Public Record. Based on information contained in the PDS, EPA divided the MM&R category into two phases by major industrial groups or sectors. The Agency announced its schedule for the development of effluent guidelines for two separate MM&R phases in EPA's January 2, 1990 Effluent Guidelines Plan (55 FR 80). One of the primary reasons for dividing the category into two phases was the large number of facilities (over 900,000) identified in the PDS as potentially included in the MM&R Point Source Category. On May 7, 1992, EPA changed the category name to Metal Products and Machinery (MP&M) to clarify the coverage of the category (57 FR 19748). Many questionnaire respondents found the MM&R label confusing and interpreted the category to apply only to machinery sites. The Agency believes that the MP&M title more accurately describes the coverage of the category.

The MP&M Point Source Category includes sites that generate wastewater while processing metal parts, metal products, and machinery. The category covers process wastewater generated during manufacturing, assembly, rebuilding, repair, or maintenance of metal parts, products or machines for use in the following industrial sectors:

- C Aerospace;
- C Aircraft;
- C Bus and Truck;
- C Electronic Equipment;
- C Hardware;
- C Household Equipment;
- C Instruments;
- C Job Shops;
- C Mobile Industrial Equipment;
- C Motor Vehicles;
- C Office Machines;
- C Ordnance;
- C Precious Metals and Jewelry;
- C Printed Wiring Boards;
- C Railroad;
- C Ships and Boats;
- C Stationary Industrial Equipment; and
- C Miscellaneous Metal Products.

EPA proposed effluent limitations guidelines, pretreatment standards, and new source performance standards for the seven MP&M Phase I industrial sectors on May 30, 1995 (60 FR 28210). These seven industrial sectors included aerospace, aircraft, electronic equipment, hardware, mobile industrial equipment, ordnance, and stationary industrial equipment. EPA

received over 4,000 pages of public comment on the Phase I proposal. One area where commenters from all stakeholder groups (i.e, industry, environmental groups, regulators) were in agreement was that EPA should not divide the industry into two separate regulations. Commenters raised concerns regarding the regulation of similar facilities with different compliance schedules and potentially different limitations solely based on whether they were in a Phase I or Phase II MP&M industrial sector. Furthermore, many facilities performed work in multiple sectors. In such cases, permit writers and control authorities (e.g., POTWs) would need to decide which MP&M rule (Phase I or II) applied to a facility.

Based on these comments, EPA proposed merging the two phases into one rule (61 FR 35042; July 3, 1996). In 1997, EPA obtained approval from the U.S. District Court for the District of Columbia to combine MP&M Phases I and II into a single regulation for the 18 MP&M industrial sectors and to extend the effluent guidelines schedule (62 FR 8726; February 26, 1997). Extension of the schedule allowed EPA to use POTW survey data to develop more precise estimates of administrative burden and allowed more extensive stakeholder involvement for data collection. Under the 304(m) decree as amended, the final action on the MP&M rule is to be taken by December 2002.

3.0 DATA COLLECTION ACTIVITIES

This section summarizes the Agency's data collection activities for the MP&M rulemaking effort. Section 3.1 summarizes the 1989 and 1996 MP&M industry questionnaires including their purpose, recipient selection process, types of information collected, and uses of data, Sections 3.2 and 3.3 summarize the site visit and field sampling programs, respectively, conducted at MP&M sites. Sections 3.4, 3.5, and 3.6 discuss other data sources.

3.1 Industry Questionnaires

EPA distributed two screener and six detailed questionnaires (surveys) as part of the data collection effort for the MP&M Point Source Category. As discussed in Section 2.0, EPA initially divided the MP&M Point Source Category into two phases by major industrial sectors. The surveys distributed for the seven Phase I industrial sectors requested data reflecting 1989 operations, and the surveys distributed for the 11 Phase II industrial sectors requested data reflecting 1996 operations. The table below lists the industry surveys and the distribution dates. Sections 3.1.1 and 3.1.2 discuss these questionnaire efforts.

Distribution of the MP&M Industry Surveys

Type of Survey	Survey Name	Distribution Date
Screener	1989 Screener Survey	8/90
	1996 Screener Survey	12/96
	1996 Benefits Screener	10/98
Detailed	1989 Detailed Survey	1/91
	1996 Long Survey	6/97
	1996 Short Survey	9/97
	1996 Municipality Survey	6/97
	1996 POTW Survey	11/97
	1996 Federal Survey	4/98

3.1.1 The 1989 Industry Surveys

EPA distributed a screener and a detailed survey for the initial MP&M proposed regulation to manufacturing, rebuilding, and/or maintenance facilities engaged in the following seven industrial sectors:

- C Aerospace;
- C Aircraft;
- C Electronic Equipment;
- C Hardware;
- C Mobile Industrial Equipment;

- C Ordnance; and
- C Stationary Industrial Equipment.

The survey instructions and appendices provide descriptions of the industrial sectors. The 1989 screener and detailed surveys are discussed below. EPA fully describes the recipient selection, stratification schemes, and the type and potential use of the information requested in the Information Collection Request (ICR) for the 1989 screener and detailed metal products and machinery industry surveys. The ICR can be found in the MP&M Administrative Record.

3.1.1.1 1989 Screener Survey

In August and September 1990, EPA mailed 8,342 screener surveys [also referred to as the Mini Data Collection Portfolio (MDCP)] to sites believed to be engaged in MP&M manufacturing, rebuilding, or maintenance activities in one of the seven industrial sectors listed above. Mailout of the screener was the preliminary step in an extensive data-gathering effort for these seven MP&M sectors. The purpose of the screener was to identify sites to receive the more detailed survey and to make a preliminary assessment of these seven MP&M sectors.

1989 Screener Recipient Selection and Distribution

The Agency sent the screener to randomly selected MP&M sites engaged in manufacturing, rebuilding, or maintenance operations in the seven industrial sectors. EPA identified potential recipients using Standard Industrial Classification (SIC) codes. To examine trends and similarities in manufacturing across the MP&M industrial sectors, EPA also sent screener surveys to some facilities performing manufacturing in the following eight industrial sectors:

- C Bus and Truck;
- C Household Equipment;
- C Instruments;
- C Motor Vehicles;
- C Office Machines;
- C Precious and Nonprecious Metals;
- C Railroad; and
- C Ships and Boats.

The Agency did not send the screener to sites whose SIC codes indicated that they were engaged in only MP&M rebuilding or maintenance (not manufacturing) operations in the eight industrial sectors.

The Agency identified more than 190 SIC codes applicable to the seven MP&M sectors listed in Section 3.1.1. Within each sector, EPA identified between one and 40 SIC codes. EPA calculated the number of sites to receive the screener within each SIC code by a coefficient of variation (CV) minimization procedure, described in the Statistical Summary for the Metal

Products & Machinery Industry Surveys. Based on the number of sites selected within each SIC code, the Agency purchased a list of randomly selected names and addresses from the Dun & Bradstreet database for each SIC code. This list included twice the number of sites specified by the CV minimization procedure for each SIC code.

EPA deleted sites from the Dun & Bradstreet list for the following reasons: sites had SIC codes that were inconsistent with company names; sites were corporate headquarters without manufacturing, rebuilding, or maintenance operations; or sites had insufficient mailing addresses. EPA then randomly selected 30 to 60 sites within each SIC code and assigned each site a randomly selected identification number. EPA assigned each site identification number a corresponding barcode to track the distribution and processing of the screeners.

EPA established a toll-free helpline from August through October of 1990 to assist screener recipients in completing the survey. This helpline received approximately 900 calls from screener recipients. Additional information about the screener mailing (e.g., a copy of the screener, specific mailing and processing procedures, non-CBI screener responses, follow-up letters, and notes from helpline telephone conversations) is discussed in the following sections and is contained in the MP&M Public Record.

1989 Screener Mailout Results

EPA initially mailed 8,000 screener surveys in August 1990. Based on the number of surveys returned undelivered, EPA mailed an additional 342 in September 1990. In addition, EPA received 22 unsolicited responses to the survey. Of the 8,364 potential respondents to the screener, including those who provided unsolicited responses, 7,846 received the screener. Screeners for the remaining 518 were returned to EPA as undeliverable. EPA assumed these sites to be out of business. Of the total potential respondents, 84 percent (6,981) returned the screener to EPA. A blank copy of the screener form and nonconfidential portions of the completed screeners are contained in the MP&M Public Record. Table 3-1 and Figure 3-1 summarize the mailout results for the 1989 and 1996 survey efforts.

Information Collected

The Agency requested the following site-specific information in the 1989 screener:

- C Name and address of facility;
- C Contact person;
- C Parent company;
- C Sectors in which the site manufactures, rebuilds, or maintains machines or metal components;

Table 3-1**1989 and 1996 MP&M Survey Mailout Results**

Survey Type	Mailed	Returned Undelivered	Returned (%)	Not Returned (%)	Respondents Engaged in MP&M Operations (%)	Respondents Not Engaged in MP&M Operations (%)
1989 Screener Survey	8,342	518	6,981 ^a (84)	865 (11)	3,598 (52)	3,373 (48)
1989 Detailed Survey	1,020	0	998 ^b (98)	22 (X)	792 (79)	199 (20)
1996 Screener Survey	5,325	579	4248 (80)	497 (10)	2,424 (57)	1,824 (12)
1996 Benefits Screener	1750	155	1392 (80)	161 (10)	1354 (97)	38(3)
1996 Long Detailed Survey	353	1	311 (88)	41 (12)	297 ^c (95)	8 (3)
1996 Short Detailed Survey	101	1	83 (82)	17 (17)	75 (90)	8 (10)
1996 Municipality Detailed Survey	150	3	135 (90)	12 (8)	71 (53)	64 (47)
1996 POTW Detailed Survey	150	2	147 (98)	1 (1)	144 (98)	3 (2)
1996 Federal Detailed Survey	--	--	51 (--)	--	44 (86)	7 (14)

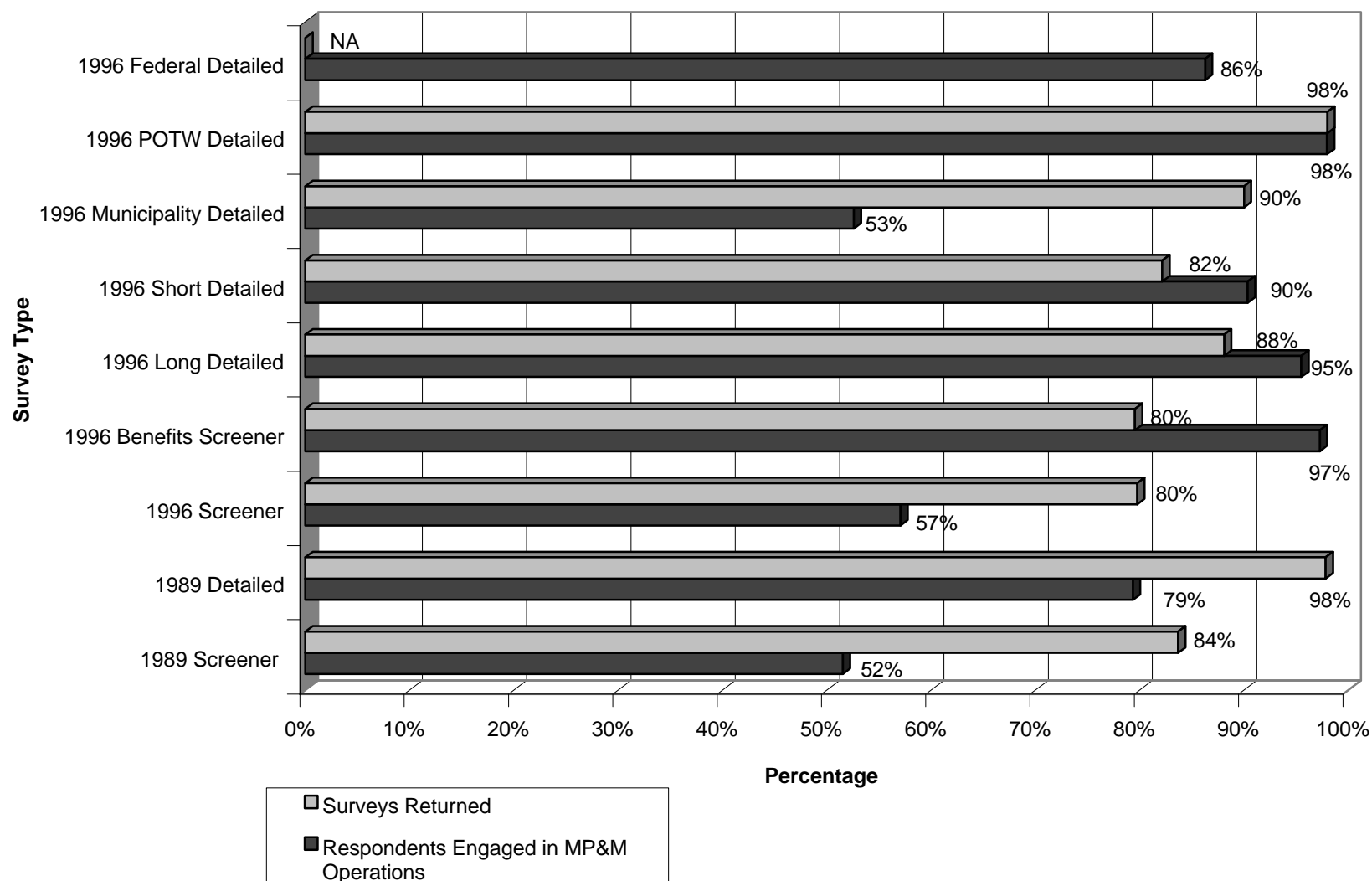
^aIncludes 22 unsolicited responses.

^bSeven of the 1989 detailed surveys were returned too late to be incorporated into the detailed survey database.

^cIncludes long survey respondents that discharge <1 mgd.

-- Not applicable to the survey.

Source: 1989 and 1996 Survey Tracking Systems.



* NA - The number of federal surveys distributed is not certain, and the percentage of returned surveys cannot be calculated.

Figure 3-1. Percentage of 1989 and 1996 MP&M Surveys Returned and Percentage of Survey Respondents Engaged in MP&M Unit Operations

- C SIC codes corresponding to products at the site;
- C Number of employees;
- C Annual revenues;
- C Unit operations performed at the site;
- C Whether there is process water use and/or wastewater discharge for each unit operation performed at the site; and
- C Base metal(s) on which each unit operation is performed.

The Agency used a computerized database system to store and analyze data received from the screeners. The database dictionary and all nonconfidential screener surveys are located in the MP&M Public Record.

EPA determined the number of sites engaged in MP&M operations by responses to the screener. As shown in Table 3-1, approximately 52 percent of the 1989 screener survey respondents reported that their sites were engaged in MP&M operations and approximately 48 percent reported no MP&M operations at their sites. The status of 10 of the sites could not be determined because they returned incomplete screeners and did not respond to follow-up efforts.

The Agency contacted a statistically representative sample of the nonrespondent sites (i.e., sites that did not return the screener) and sites reporting “not engaged” in MP&M operations to determine whether their responses were due to confusion over the scope of the MP&M industry. Based on the results of this follow-up, EPA adjusted the survey weights for misclassification and response. The methodology for calculating the adjustment factors is provided in Chapter 4 of the Statistical Summary for the Metal Products and Machinery Industry Surveys, Part I which is located in the MP&M Administrative Record.

1989 Screener Data Entry, Engineering Coding, and Analysis

EPA reviewed all of the screener surveys prior to data entry. As part of this effort, the Agency reviewed all documentation provided by the site, corrected errors and deficiencies, and coded the information for data entry. In some cases, these revisions required telephone contact with site personnel. The Agency contacted more than 1,100 screener recipients to resolve survey deficiencies and code information for data entry. Following preliminary review, EPA entered the scannable data (i.e., responses to multiple-choice, Mark Sense™ questions) into the database using a Scantron™ reader. EPA scanned each form twice and compared the information using a computer program as a quality control (QC) check. The Agency performed double-key entry of nonscannable data, resolved any inconsistencies, and converted the data to database files.

Based on the screener mailout results, EPA developed an MP&M industry profile for the seven sectors. The screener database report provides estimates of the national population for sites in these MP&M sectors with regard to water use characteristics, size, location, sector,

unit operations, and metal types. The Statistical Summary for the Metal Products & Machinery Industry Surveys discusses the sample size determination and statistical procedures for developing national estimates for the industry.

3.1.1.2 1989 Detailed Survey

Based on responses to the 1989 screener, EPA sent a more detailed survey to a select group of water-using MP&M sites. This survey, also referred to as the data collection portfolio (DCP), was designed to collect detailed 1989 technical and financial information. EPA used this information to characterize MP&M sites from the seven industrial sectors, develop pollutant loadings and reductions, and develop compliance cost estimates, as discussed later in this document.

EPA mailed 896 detailed surveys in January 1991. Based on the number of detailed surveys returned undelivered, EPA mailed an additional 124 detailed surveys in January and February 1991, for a total of 1,020 detailed surveys mailed. A blank copy of the 1989 detailed survey and copies of the nonconfidential portions of the completed detailed surveys are located in the MP&M Public Record.

1989 Detailed Survey Recipient Selection and Distribution

EPA selected 1,020 detailed survey recipients from the following three groups of sites:

- C Water-discharging 1989 screener respondents (860 sites);
- C Water-using 1989 screener respondents that did not discharge process water (74 sites); and
- C Water-discharging sites from key MP&M companies that did not receive the 1989 screener (86 sites).

The methods used to select sites within each group are described below.

The Agency mailed the 1989 detailed survey to all 860 water-discharging screener respondents. EPA's intent in collecting detailed data from all 860 sites was to characterize the potential variations in unit operations performed and water use practices among water-discharging sites in these seven MP&M industrial sectors.

The Agency mailed the 1989 detailed survey to a probability sample of 50 screener respondents that reported using but not discharging process water. EPA selected these sites to provide information on water-use practices at sites that use but do not discharge process water, and to determine if "zero-discharge" practices used at those sites could be used at other MP&M sites. In addition to the 50 probability sample sites, EPA also mailed the 1989 detailed survey to an additional 24 screener respondents that reported using but not discharging process water. The

Agency selected these sites because they performed unit operations that were not expected to be sufficiently characterized by detailed surveys mailed to other sites. The unit operations that EPA expected at each of the 24 sites are listed in the MP&M Public Record.

EPA mailed the 1989 detailed survey to 86 sites that did not receive the 1989 screener. The Agency identified these sites to represent key companies in the MP&M industry that EPA did not select as 1989 detailed survey recipients based on the screener mailout. EPA identified key companies from Dun & Bradstreet company lists, the Thomas Register, Fortune Magazine's list of the top 500 U.S. companies, and MP&M site visits at companies with annual revenues of \$50 million or more that EPA believed to be leading companies in their particular MP&M sector. The Agency contacted each of the key companies to identify sites within the company that were engaged in MP&M operations and used process water to perform MP&M operations. Records of these follow-up telephone calls are located in the MP&M Public Record. EPA did not use these 86 surveys for developing the national estimates because the Agency did not randomly select these facilities.

EPA operated a toll-free telephone helpline from January until July 1991 to assist recipients in completing the 1989 detailed survey. The helpline received approximately 1,400 calls from detailed survey recipients. Callers to the 1989 detailed survey helpline typically requested the following:

- C Assistance with the technical sections of the detailed survey (e.g., technical clarification of unit operation definitions);
 - C Additional time to complete the survey;
 - C Assistance with the financial sections of the detailed survey (these calls were referred to a separate economics helpline); or
 - C Clarification of the applicability of the survey (i.e., did the survey apply to the site?).

Records for nonconfidential telephone calls to the helpline and to EPA personnel are located in the MP&M Public Record.

1989 Detailed Survey Mailout Results

Table 3-1, on page 3-4, summarizes the results of the detailed survey mailout. Of the 1,020 sites that received the detailed survey, 998 responded to the survey and 22 did not. Of the sites that responded, EPA did not include 199 sites in the detailed survey database for one of the following reasons:

- C The site was out of business;
 - C The site did not use process water;

- C The site was not engaged in MP&M operations; or
- C Process information at the site was Department of Defense or Department of Energy classified information.

Specific reasons for not using data from these sites are located in the MP&M Public Record.

Upon review of the detailed surveys submitted by these sites, EPA determined 87 sites to be in the other 11 industrial sectors rather than the seven sectors identified in Section 3.1.1. Because the scope of the detailed survey mailout effort included only sites from the seven industrial sectors listed in Section 3.1.1, EPA did not include these 87 sites in the detailed survey database.

Information Collected

This section describes the information collected in each part of the 1989 detailed survey and the reasons for collecting this information. The detailed survey instructions and the Information Collection Request (ICR) for this project contain further details on the types of and potential uses for information collected. These documents are located in the MP&M Administrative Record.

The Agency designed the 1989 detailed survey to collect information necessary to develop effluent guidelines and standards for the MP&M industry. EPA divided the detailed survey into the following parts:

- C Part I - General Information;
- C Part II - Process Information;
- C Part III - Water Supply;
- C Part IV - Wastewater Treatment and Discharge;
- C Part V - Process and Hazardous Wastes; and
- C Part VI - Financial and Economic Information.

Part I (questions 1 through 13) requested information necessary to identify the site, to characterize the site by certain variables, and to confirm that the site was engaged in MP&M operations. This information included: site name, address, contact person, number of employees, facility age, average energy usage, discharge permit status, and MP&M activity (manufacturing, rebuilding, or maintenance).

Part II (questions 14 through 21) requested detailed information on MP&M products, production levels, unit operations, activity, water use for unit operations, wastewater discharge from unit operations, miscellaneous wastewater sources, waste minimization practices (e.g., pollution prevention), and air pollution control for unit operations. EPA requested the site to provide detailed technical information (e.g., water balance, chemical additives, metal type processed, disposition of wastewater) for each MP&M unit operation and air pollution control

device using process water. This section also requested information on unique and/or auxiliary MP&M operations. EPA used this information to evaluate raw waste characteristics, water use and discharge practices, and sources of pollutants for each MP&M unit operation.

Part III (question 22) requested information on the water supply for the site. EPA requested the site to specify the source water origin, average intake flow, average intake operating hours, and the percentage of water used for MP&M operations. EPA used this information to evaluate overall water use for the site.

Part IV (questions 23 through 33) requested detailed information on MP&M influent and effluent wastewater treatment streams and wastewater treatment operations. The information requested included: the origin of each stream contributing to the site's overall wastewater discharge; a block diagram of the wastewater treatment system; detailed technical information (e.g., wastewater stream flow rates, treatment chemical additives, system capacity, disposition of treatment sludge) for each wastewater treatment operation; self-monitoring data; and capital and operating cost data. EPA collected this information to evaluate treatment in place at MP&M sites, to develop and design a cost model and to assess the long-term variability of MP&M effluent streams.

Part V (question 34) requested detailed information on the types, amounts, and composition of wastewater and solid/hazardous wastes generated during production or waste treatment, and the costs of solid waste disposal. EPA collected this information to evaluate the types and amounts of wastes currently discharged, the amount of waste that is contract hauled off site, and the cost of contract-hauling wastes.

Part VI requested detailed financial and economic information from the site and the company owning the site. The Economic, Environmental, and Benefits Analysis document for the proposed rule, which is located in the MP&M Administrative Record, presents information from this part.

1989 Detailed Survey Review, Coding, and Data Entry

The Agency completed a detailed engineering review of the detailed surveys, including coding responses to questions from Parts I through V of the detailed surveys to facilitate entry of technical data into a database. The MP&M DCP Database Dictionary identifies all database codes developed for this effort and the database dictionary for Section VI of the detailed survey are located in the MP&M Administrative Record.

The Agency followed up with telephone calls to all respondents who: (1) did not provide information on operations (manufacturing, rebuilding, or maintenance) or sectors; (2) did not provide metal type or unit operation descriptions for each water-using unit operation; or (3) did not provide descriptions for each wastewater treatment operation. EPA also made follow-up calls to clarify incomplete or contradictory technical or economic information. EPA confirmed all information obtained from follow-up calls by sending a letter to the site.

EPA developed a database to store all technical data provided in the detailed surveys. After engineering review and coding, the Agency entered data from the detailed surveys into the database using a double key-entry and verification procedure. EPA coded and entered data from 792 detailed survey respondents determined to be engaged in MP&M activities into the detailed survey database. The MP&M DCP Database Dictionary presents the database structure and defines each field in the detailed survey database and the codes that describe data in these fields.

1989 Detailed Survey Data Analysis

The Statistical Summary for the Metal Products & Machinery Industry Surveys provides estimates of the national population of MP&M water-discharging sites with regard to size, location, sector, unit operations, metal types, discharge flows, and production-normalized flows. The report discusses the statistical procedures for developing national estimates for the industry, and is located in the MP&M Administrative Record.

3.1.2 The 1996 Industry Surveys

Between 1996 and 1998, EPA distributed one screener and five detailed surveys. The five detailed surveys included the long, short, municipality, federal, and publicly owned treatment works (POTW) surveys. The Agency distributed the 1996 surveys to commercial and government (federal, state, and local) facilities that manufacture, rebuild, or maintain metal products or parts to be used in one of the following 11 MP&M industrial sectors:

- C Bus and Truck;
- C Household Equipment;
- C Instruments;
- C Job Shops;
- C Motor Vehicles;
- C Office Machines;
- C Precious Metals and Jewelry;
- C Printed Wire Boards;
- C Railroad;
- C Ships and Boats; and
- C Miscellaneous Metal Products.

The job shop sector includes facilities that manufacture, rebuild, or maintain metal products or parts but do not own 50 percent or more of the items they process. EPA distributed the POTW detailed survey to POTWs to assess the impact of the MP&M regulation on permitting entities. The 1996 screener and detailed surveys are discussed below. Recipient selection, stratification schemes, and the type and potential use of the information requested are described in more detail in the ICR for the 1996 screener and detailed metal products machinery industry surveys which is located in the MP&M Administrative Record.

3.1.2.1 1996 Screener Surveys

In December 1996 and February 1997, EPA distributed 5,325 screener surveys to sites believed to be engaged in MP&M manufacturing, rebuilding, or maintenance activities in one of 11 MP&M industrial sectors listed above. The purpose of the screener surveys was to identify sites to receive the more detailed survey and to make a preliminary assessment of the MP&M industry for the 11 industrial sectors listed in Section 3.1.2. EPA sent an additional 1,750 screeners to facilities located in Ohio (a state with a high concentration of MP&M facilities) as part of the benefits study. The Agency used these screeners to collect data to analyze environmental benefits.

1996 Screener Recipient Selection and Distribution

As discussed above, EPA sent the 1996 screener survey to 5,325 randomly selected MP&M sites (includes replacement sites). The Agency selected potential recipients from the Dun & Bradstreet database based on the industrial sector (using the SIC code), activity (i.e., manufacturing, maintenance, or rebuilding), size as measured by number of employees, and wastewater discharge flow rate.

The Agency identified more than 126 SIC codes applicable to the 11 MP&M sectors. Within each sector, EPA identified between 1 and 26 SIC codes. EPA calculated the number of sites to receive the 1996 screener within each SIC code by a coefficient of variation (CV) minimization procedure described in the Statistical Summary for the Metal Products & Machinery Industry Surveys. Based on the number of sites selected within each SIC code, the Agency obtained a list of randomly selected names and addresses from Dun & Bradstreet. This list included twice the number of sites specified by the CV minimization procedure for each SIC code. EPA randomly selected the initial list of sites from the Dun & Bradstreet database for each SIC code.

EPA reviewed the potential sites and deleted sites for the following reasons:

- C The site was a corporate headquarters without manufacturing, rebuilding, or maintenance operations;
- C The site received a 1989 screener or detailed survey;
- C The site was a duplicate of a miscellaneous facility in the list of potential MP&M sites.
- C The site had an SIC code which was inconsistent with company name; or
- C The site had an insufficient mailing address.

EPA established a toll-free telephone helpline and an electronic mail address to assist screener recipients in completing the survey. EPA received helpline calls and electronic

mail inquiries from more than 600 screener recipients. Nonconfidential notes from helpline and review follow-up calls are located in the MP&M Public Record.

1996 Screener Mailout Results

EPA initially mailed 4,900 surveys in December 1996. The Agency distributed an additional 425 surveys to replace surveys that were returned undelivered. EPA assumed the undeliverable sites to be out of business. Of the 5,325 surveys mailed, 80 percent (4,248) of the recipients returned completed surveys to EPA. A blank copy of the 1996 screener and nonconfidential portions of the completed screeners are located in the MP&M Public Record. Table 3-1 and Figure 3-1, on pages 3-4 and 3-5, summarize the MP&M survey mailout results.

The Agency contacted a statistically representative sample of nonrespondent sites to determine whether these sites were engaged in MP&M operations and discharged process wastewater. Only 24 percent of the nonrespondents contacted were engaged in MP&M operations, and approximately half of these facilities did not discharge process wastewater.

Information Collected

The Agency requested the following site-specific information in the screener:

- C Name and address of facility;
- C Contact person;
- C Whether process water is used at the site;
- C Destination of process wastewater discharged;
- C Volume of process wastewater discharged;
- C Number of employees;
- C Annual revenue;
- C Sectors in which the site manufactures, rebuilds, or maintains machines or metal components; and
- C Unit operations performed at the site and whether there is water use and/or wastewater discharge for each unit operation performed at the site.

The Agency used a computerized database system to store and analyze data received from the 1996 screeners. Nonconfidential portions of the screener surveys and the database dictionary are located in the MP&M Administrative Record.

1996 Screener Data Review and Data Entry

EPA reviewed the 1996 screener survey for accuracy and consistency and formatted the information for data entry. The Agency contacted approximately 1,800 screener respondents to resolve deficient and inconsistent information prior to data entry. Following review, EPA double key-entered and compared the data from the formatted screeners, using a computer program, as a quality control check. The Agency then reviewed the database files for deficiencies and inconsistencies, and resolved all issues for the final survey database.

1996 Benefits Screener Survey

For an environmental benefits study, EPA sent the 1996 screener survey to 1,750 (including replacement sites) randomly selected sites in Ohio, a state with a large number of MP&M sites. EPA used the data for the environmental benefit analyses. The selection criteria and sampling frame for the benefits screener recipients are described in more detail in memoranda located in the MP&M Administrative Record.

The Agency initially mailed the benefits screener to 1,600 facilities in October 1998. EPA mailed an additional 150 facilities the screener in February 1999 to replace surveys that were returned undelivered. The Agency assumed the undeliverable surveys to be out of business. Of the 1,750 surveys mailed, 80 percent (1,392) of the recipients returned completed screeners to EPA. A blank copy of the 1996 benefits screener and nonconfidential portions of the completed benefits screeners are located in the MP&M Public Record. Table 3-1 and Figure 3-1, on pages 3-4 and 3-5, summarize MP&M mailout results.

EPA established a toll-free telephone helpline and an electronic mail address to assist screener recipients in completing the survey. EPA received helpline calls and electronic mail inquiries from more than 900 benefits screener recipients. Nonconfidential notes from helpline and review follow-up calls are located in the MP&M Public Record.

The Agency followed the same review, data entry, and database development procedures used for the original 1996 screener survey. The benefits screener database is discussed in the Economic, Environmental, and Benefits Analysis of the Proposed Metal Products & Machinery Rule. EPA contacted more than 400 screener respondents to resolve deficient and inconsistent information prior to data entry.

3.1.2.2 1996 Long Detailed Survey

EPA distributed the long detailed surveys in June 1997 to 353 MP&M wastewater-discharging industrial facilities. EPA designed this survey to gather detailed technical and economic information required to develop the MP&M effluent limitations guidelines and standards. The long survey is discussed below.

1996 Long Survey Recipient Selection and Distribution

In June 1997, EPA sent the long survey to all 353 1996 screener respondents who indicated they performed operations in one of the 11 MP&M industrial sectors listed in Section 3.1.2 and discharged one million or more gallons of MP&M process wastewater annually. EPA established a toll-free telephone helpline and an electronic mail address to assist long survey recipients in completing the survey. EPA received helpline calls and electronic mail inquiries from approximately 200 long survey recipients. Nonconfidential notes from helpline and review follow-up calls are located in the MP&M Public Record.

1996 Long Survey Mailout Results

Of the 353 surveys mailed, 88 percent (311) of the recipients returned completed surveys to EPA. One survey was returned as undelivered and EPA assumed the facility to be out of business. A blank copy of the 1996 long survey and nonconfidential portions of the completed long surveys are located in the MP&M Public Record. Table 3-1 and Figure 3-1, on pages 3-4 and 3-5, summarize the MP&M survey mailout results.

Information Collected

This section describes the information collected in each section of the 1996 long survey and the reason EPA collected the information. Further details on the types of information collected and the potential uses of the information are contained in the ICR for this project and in the survey instructions which are located in the MP&M Administrative Record.

EPA divided the long detailed survey into the following sections:

- C Section I: General Site Information;
- C Section II: General Process Information;
- C Section III: Specific Process Information;
- C Section IV: Economic Information; and
- C Section V: Voluntary Supplemental Information.

Table 3-2 summarizes the information requested in the 1996 long, short, federal, and municipality detailed surveys by question number. EPA designed the long, short, municipality, and federal surveys to collect similar detailed process information from different audiences, as discussed below for each survey.

Table 3-2**Summary of 1996 Detailed Survey Information by Question Number**

Survey Question Number			Type of Information Requested
Long and Federal	Short	Municipality	
Section I 1	Section I 1	Part II 1	Industrial sector activities
Section II 2-5	Section II 2-5	2-5	Site location and facility contact
6,7	6, 7	5, 6	Number of employees and age of site
8,9	8, 9	7, 8	Discharge status and destination
10	10	9	Permits under Miscellaneous categorical effluent guidelines
---	11-12	10-11	Types of end-of-pipe wastewater treatment units
11	13	12	Metal types processed
12	15	13	5 major products (quantity and sector)
13	16	14	Unit operations: water use and associated rinses
Section III 14-15	---	---	General water use and costs
16	---	---	Production process diagram
17-23	---	---	Detailed description of wet unit operations performed
24-29	Section II 17	16	In-process pollution prevention technologies or practices
30	---	---	Wastewater treatment (WWT) diagram
31-41	---	---	Detailed design and operating parameters of WWT units
42	---	---	WWT costs by treatment unit
43-44	Section II 14	15	Wastewater sampling and analysis conducted
45	---	---	Contract haul and disposal costs
---	---	---	Facility comments page
Section IV 1-9	Section IV 1-8	Part I 1-3	Financial and economic data
Section V 1	Section V 1	---	Parent firm name and contact, number of Miscellaneous MP&M facilities
2	2	---	Number of employees for Miscellaneous facility(ies)
3	3	---	MP&M sector and activity
2, 4	2, 4	---	Discharge status and destination
5	5	---	Unit operations: water use and discharge status

--- Question is not applicable to this survey.

Section I requested information to determine if the facility was engaged in MP&M operations. Question 1 requested the site to identify the MP&M industrial sector and type of activity (manufacturing, rebuilding, or maintenance) performed.

Section II requested information to identify the site location and contact person, number of employees, facility age, process wastewater discharge status and destination, and wastewater discharge permits and permitting authority. This section also requested general information about metal types processed, MP&M products and production levels, water use for unit operations, and wastewater discharge from unit operations. EPA used the process information to evaluate water use and discharge practices, and sources of pollutants for each MP&M unit operation.

Section III requested detailed information on MP&M wet unit operations, pollution prevention practices, wastewater treatment technologies, costs for water use and wastewater treatment systems, and wastewater/sludge disposal costs. EPA also requested the site to provide block diagrams of the production process and the wastewater treatment system. The unit operation information requested included: metal types processed, production rate, operating schedule, chemical additives, volume and destination of process wastewater and rinse waters, in-process pollution prevention technologies, and in-process flow control technologies. The information requested for each wastewater treatment unit included: operating flow rate, design capacity, operating time, chemical additives, and unit operations discharging to each treatment unit. In addition, EPA requested the site to provide the type of MP&M wastewater sampling data collected. EPA used these data to characterize the industry, to perform subcategorization analyses, to identify best management practices, to evaluate performance of the treatment technology for inclusion in the regulatory options, and to develop regulatory compliance cost estimates.

Section IV requested detailed financial and economic information about the site or the company owning the site. Information from this section is presented in the Economic, Environmental, and Benefits Analysis of the Proposed Metal Products & Machinery Rule, which is located in the MP&M Administrative Record.

Section V requested supplemental information on Miscellaneous MP&M facilities owned by the company. EPA included this voluntary section to measure the combined impact of proposed MP&M effluent guidelines on companies with multiple MP&M facilities that discharge process wastewater. This section requested the same information collected in the 1996 MP&M screener survey. Responses to questions in this section provided the size, industrial sector, revenue, unit operations, and water usage of the company's Miscellaneous MP&M facilities.

1996 Long Survey Data Review and Data Entry

EPA completed a detailed engineering review of Sections I through III of the detailed survey to evaluate the accuracy of technical information provided by the respondents. During the engineering review, EPA coded responses to facilitate entry of technical data into the long survey database. The MP&M 1996 Long Survey Database Dictionary identifies the database codes developed for this project, and is located in the MP&M Administrative Record. EPA

contacted approximately 240 long survey respondents, by telephone and letter, to clarify incomplete or inconsistent technical information prior to data entry.

The Agency developed a database for the technical information provided by survey respondents. After engineering review and coding, EPA entered data from 297 long surveys into the database using a double key-entry and verification procedure. The MP&M 1996 Long Survey Database Dictionary presents the database structure and defines each field in the files for the long survey database. EPA did not include data from 14 long survey respondents in the database for the following reasons:

- Ⓒ The site was out of business;
- Ⓒ The site did not use process water;
- Ⓒ The site was not engaged in MP&M operations; or
- Ⓒ The site provided insufficient data and the survey was returned too late to enter into the database.

3.1.2.3 1996 Short Detailed Survey

EPA distributed the short surveys in September 1997 to 101 MP&M wastewater-discharging industrial facilities. EPA designed this survey to gather technical and economic information required to develop the MP&M effluent limitations guidelines and standards. The short survey is discussed below.

1996 Short Survey Recipient Selection and Distribution

EPA initially sent 100 short surveys in September 1997 and mailed one additional survey to a site to replace a short survey that was returned undelivered; EPA assumed the undeliverable site to be out of business. The Agency sent the short surveys to randomly selected 1996 screener respondents who performed operations in one of the 11 MP&M industrial sectors identified in Section 3.1.2 and indicated they discharged less than one million gallons of MP&M process wastewater annually. The selection criteria and sampling frame for short survey recipients are described in more detail in the Statistical Summary for the Metal Products & Machinery Industry Surveys.

EPA established a toll-free telephone helpline and an electronic mail address to assist short survey recipients in completing the survey. EPA received helpline calls and electronic mail inquiries from approximately 20 short survey recipients. Nonconfidential notes from helpline and review follow-up calls are located in the MP&M Public Record.

1996 Short Survey Mailout Results

Of the 101 surveys mailed, 82 percent (83 surveys) of the recipients returned completed surveys to EPA. A blank copy of the 1996 short survey and nonconfidential portions of the completed short surveys are located in the MP&M Public Record. Table 3-1 and Figure 3-1, on pages 3-4 and 3-5, summarize the MP&M survey mailout results.

Information Collected

The information collected in the 1996 short survey included the identical general site and process information and economic information collected in Sections I, II, IV, and V of the long detailed survey (see Section 3.1.2.2). To minimize the burden on facilities discharging less than one million gallons of process wastewater, EPA did not require these facilities to provide the detailed information on MP&M unit operations or treatment technologies that EPA requested in Section III of the long survey. The ICR for this project and the survey instructions have further details on the types of information collected and the potential uses of the information.

EPA divided the short survey into the following sections:

- C Section I: General Site Information;
- C Section II: General Process Information;
- C Section IV: Economic Information; and
- C Section V: Voluntary Supplemental Information.

Table 3-2, on page 3-16, summarizes the 1996 short survey information by question number.

1996 Short Survey Data Review and Data Entry

EPA completed a detailed engineering review of Sections I and II of the short survey to evaluate the accuracy of technical information provided by the respondents. During the engineering review, EPA coded responses to facilitate entry of technical data into the short survey database. The MP&M 1996 Short Survey Database Dictionary identifies the database codes developed for this project and is located in the MP&M Administrative Record. EPA contacted more than 60 short survey respondents, by telephone and letter, to clarify incomplete or inconsistent technical information prior to data entry.

The Agency developed a database for the technical information provided by survey respondents. After engineering review and coding, EPA entered data for 75 short surveys into the database using a double key-entry and verification procedure. The MP&M 1996 Short Survey Database Dictionary presents the database structure and defines each field in the files for the short survey database. EPA did not include data from eight short survey respondents in the database for the following reasons:

- C The site was out of business;
- C The site did not use process water; or

C The site was not engaged in MP&M operations.

3.1.2.4 1996 Municipality Detailed Survey

EPA distributed the municipality surveys in June 1997 to 150 city and county facilities that might operate MP&M facilities. EPA designed this survey to measure the impact of this rule on municipalities and Miscellaneous government entities that perform maintenance and rebuilding operations on MP&M products (i.e., bus and truck, automobiles, etc.).

Recipient Selection and Distribution

The Agency sent the municipality survey to 150 city and county facilities randomly selected from the Municipality Year Book-1995 based on population and geographic location. EPA allocated sixty percent of the sample to municipalities and 40 percent to counties. The 60/40 distribution was approximately proportional to their aggregate populations in the frame. The Agency divided the municipality sample and the county sample into three size groupings as measured by population. For municipalities, the population groupings were: less than 10,000 residents, 10,000 - 50,000 residents, and 50,000 or more residents. For counties, the population groupings were: less than 50,000 residents, 50,000-150,000 residents, and 150,000 or more residents. The geographic stratification conformed to the Census definitions of Northeast, North Central, South, Pacific, and Mountain states.

EPA established a toll-free telephone helpline and an electronic mail address to assist municipality survey recipients in completing the survey. EPA received helpline calls and electronic mail inquiries from more than 50 municipality survey recipients. Notes from helpline and review follow-up calls are located in the MP&M Administrative Record.

1996 Municipality Survey Mailout Results

EPA distributed 150 municipality surveys in June 1997. Three surveys were returned undelivered. Of the 150 surveys mailed, 90 percent (135) of the recipients returned completed surveys to EPA. A blank copy of the 1996 municipality survey and nonconfidential portions of the completed municipality surveys are located in the MP&M Public Record. Table 3-1 and Figure 3-1, on pages 3-4 and 3-5, summarize the MP&M survey mailout results.

Information Collected

The 1996 municipality survey collected economic information for the entire municipality and site-specific process information for each MP&M site operated by the municipality. The ICR for this project and the survey instructions contain further details on the types of information collected and the potential uses of the information and are located in the MP&M Administrative Record.

EPA divided the municipality detailed survey into the following parts:

- C Part I: Economic and Financial Information; and
- C Part II: General Site-Specific Process Information.

Table 3-2, on page 3-16, summarizes the 1996 municipality survey information by question number.

Part I requested information to provide the site location and contact person, number of employees, detailed financial and economic information about the entire municipality, and information necessary to determine if the municipality owned and operated MP&M sites in any of the MP&M industrial sectors. Information from this section is presented in the Economic, Environmental, and Benefits Analysis of the Proposed Metal Products & Machinery Rule, which is located in the MP&M Administrative Record.

Part II requested site-specific process information for each MP&M site owned and operated by the municipality. Question 1 requested the site to identify the MP&M industrial sector and type of activity (manufacturing, rebuilding, or maintenance) performed. The remaining questions were identical to Section II of the short detailed survey and requested facility age, process wastewater discharge status and destination, wastewater discharge permits and permitting authority, general information about metal types processed, MP&M products and production levels, water use for unit operations, and wastewater discharge from unit operations. The Agency used the process information to evaluate water use and discharge practices, and sources of pollutants for each MP&M unit operation.

1996 Municipality Survey Data Review and Data Entry

EPA completed a detailed engineering review of Part II of the municipality survey to evaluate the accuracy of technical information provided by the respondents. During the engineering review, the Agency coded responses to facilitate entry of technical data into the municipality survey database. The MP&M 1996 Municipality Survey Database Dictionary identifies the database codes developed for this project, and is located in the MP&M Administrative Record. EPA contacted more than 50 municipality survey respondents by telephone to clarify incomplete or inconsistent technical information prior to data entry.

The Agency developed a database for the technical information provided by survey respondents. After engineering review and coding, EPA entered data from 209 municipality facilities into the database using a double key-entry and verification procedure. This number is greater than the number of respondents because some municipalities had more than one site engaged in MP&M operations. The MP&M 1996 Municipality Survey Database Dictionary presents the database structure and defines each field in the files for the municipality survey database.

3.1.2.5 1996 Federal Facilities Detailed Survey

In April 1998, EPA distributed the federal facilities detailed survey to the following seven federal agencies:

- C Department of Energy;
- C Department of Defense;
- C National Aeronautics and Space Administration (NASA);
- C Department of Transportation (including the United States Coast Guard);
- C Department of Interior;
- C Department of Agriculture; and
- C United States Postal Service.

EPA designed this survey to assess the impact of the MP&M effluent limitations guidelines and standards on federal agencies that operate MP&M facilities.

Recipient Selection and Distribution

There was no specific sampling frame for the federal survey. EPA distributed the survey to federal agencies likely to perform industrial operations on metal products or machines. EPA requested representatives of seven federal agencies to voluntarily distribute copies of the survey to sites they believed performed MP&M operations. The selection criteria for federal survey recipients are described in more detail in the ICR for the 1996 MP&M industry surveys. Because the sample was not randomly selected, EPA did not use data from these surveys to develop national estimates.

EPA established a toll-free telephone helpline and an electronic mail address to assist federal survey recipients in completing the survey. EPA received helpline calls and electronic mail inquiries from approximately 20 federal survey recipients. Nonconfidential notes from helpline and review follow-up calls are located in the MP&M Public Record.

1996 Federal Survey Distribution Results

EPA distributed the federal surveys to seven federal agencies and requested that they forward copies to any of their sites that performed MP&M operations. The Agency received 51 completed federal surveys. Of the 51 returned surveys, 39 were Department of Defense facilities and 12 were NASA facilities. A blank copy of the 1996 federal survey and nonconfidential portions of the completed federal surveys are located in the MP&M Public Record.

Information Collected

The information collected in the 1996 federal survey was identical to the long survey. The federal survey included the same five sections and questions discussed in Section 3.1.2.2. The ICR for this project and the survey instructions contain further details on the types of

information collected and the potential uses of the information . Table 3-2, on page 3-22, summarizes the 1996 federal detailed survey information by question number.

Data Review and Data Entry

EPA completed a detailed engineering review of Sections I through III of the federal detailed survey to evaluate the accuracy of technical information provided by the respondents. During the engineering review, the Agency coded responses to facilitate entry of technical data into the federal survey database. The MP&M 1996 Federal Survey Database Dictionary identifies the database codes developed for this project and is located in the MP&M Administrative Record.

The Agency developed a database for the technical information provided by survey respondents. After engineering review and coding, EPA entered data from 44 federal surveys into the database using a double key-entry and verification procedure. The Agency did not include data from seven federal survey responses in the database because the sites did not use MP&M process water. The MP&M 1996 Federal Survey Database Dictionary presents the database structure and defines each field in the files for the federal survey database.

3.1.2.6 1997 Iron and Steel Industry Short Survey Data

As part of its effort to review and revise effluent limitations guidelines and standards for the iron and steel industry, EPA distributed the iron and steel industry short survey to 402 iron and steel facilities in November 1998. Following field sampling of iron and steel sites and review of the completed industry surveys, EPA decided that some iron and steel operations would be covered more appropriately by the MP&M rule because they were more like MP&M operations. These operations are steel forming and surface treatment processes and include the following:

- C Acid Cleaning/Pickling;
- C Alkaline Cleaning;
- C Annealing;
- C Conversion Coating (e.g., passivation, surface activation/fluxing)
- C Electrolytic Cleaning
- C Electroplating
- C Cold Forming (e.g., wire, bar, and rod drawing, pipe and tube forming)
- C Hot Dip Coating;
- C Lube (lime, Borax, etc.)
- C Painting
- C Salt Bath Descaling
- C Shot Blasting; and
- C Wet Air Pollution Control.

The wastewater characteristics and flows for these operations are similar to those seen in the MP&M industry, and less like the wastewater characteristics and flows associated with

the large, continuous flat-rolled products (e.g., sheet, strip, and plate) and the hot-forming operations at steel manufacturing facilities.

Based on EPA's decision regarding these operations, the Agency transferred 154 iron and steel surveys to the MP&M project. Of the 154 surveys transferred, 47 sites discharge process wastewater, 64 do not discharge process wastewater, and 43 sites discharge storm water only. The Agency coded and entered process and wastewater treatment information from 47 iron and steel surveys into the MP&M costing input database. The sites included in the costing effort were sites discharging process wastewater. The 107 iron and steel zero discharge and stormwater-only sites were not included in the costing effort. A blank copy of the 1997 iron and steel short survey and nonconfidential portions of the 47 completed iron and steel surveys are located in the MP&M Public Record.

3.1.2.7 1996 Publicly Owned Treatment Works (POTW) Detailed Survey

EPA distributed the POTW survey to 150 sites in November 1997. The Agency designed this survey to estimate benefits associated with implementation of the MP&M regulations and to estimate possible costs and burden that POTWs might incur in writing and maintaining MP&M permits or other control mechanisms.

Recipient Selection and Distribution

The Agency sent the POTW survey to 150 POTWs with flow rates greater than 0.50 million gallons per day. EPA randomly selected the recipients from the 1992 Needs Survey Review, Update, and Query System Database. EPA divided the POTW sample into two strata by daily flow rates: 0.50 to 2.50 million gallons, and 2.50 million gallons or more. The selection criteria and sampling frame for POTW survey recipients are described in more detail in the ICR for the 1996 surveys.

EPA established a toll-free telephone helpline and an electronic mail address to assist POTW survey recipients in completing the survey. EPA received helpline calls and electronic mail inquiries from approximately 50 POTW survey respondents. Nonconfidential notes from helpline and review follow-up calls are located in the MP&M Administrative Record.

1996 POTW Survey Mailout Results

EPA distributed 150 POTW surveys in November 1997. Two surveys were returned undelivered. Of the 150 surveys mailed, 98 percent (147) of the recipients returned completed surveys to EPA. A blank copy of the 1996 POTW survey and nonconfidential portions of the completed POTW surveys are located in the MP&M Public Record. Table 3-1 and Figure 3-1, on pages 3-4 and 3-5, summarize the MP&M survey mailout results.

Information Collected

The POTW survey requested data required to estimate benefits associated with implementation of the MP&M regulations and to estimate possible costs and burden that POTWs might incur in writing and maintaining MP&M permits or other control mechanisms. The ICR for this project and the survey instructions contain further details on the types of information collected and the potential uses of the information. EPA divided the POTW survey into the following parts:

C	Part I:	Introduction and Basic Information;
C	Part II:	Administrative Permitting Costs; and
C	Part III:	Sewage Sludge Use or Disposal Costs.

Part I requested site location and contact information, and the total volume of wastewater treated at the site. EPA used the wastewater flow information to characterize the size of the POTW.

Part II requested the number of industrial permits written, the cost to write the permits, the permitting fee structure, the percentage of industrial dischargers covered by National Categorical Standards (i.e., effluent guidelines), and the percentage of permits requiring expensive administrative activities. EPA used this information to estimate administrative burden and costs.

Part III requested information on the use or disposal of sewage sludge generated by the POTW. EPA required only POTWs that received discharges from an MP&M facility to complete Part III. The sewage sludge information requested included the amount generated, use or disposal method, metal levels, use or disposal costs, and the percentage of total metal loadings at the POTW from MP&M facilities. The Agency used this information to assess the potential changes in sludge handling resulting from the MP&M rule and to estimate economic benefits to the POTW related to sludge disposal and reduction in upsets/interference.

Data Review and Data Entry

EPA performed a detailed review of Parts I through III of the POTW detailed survey to evaluate the accuracy of information provided by the respondents. During review, the Agency coded responses to facilitate entry of data into the POTW detailed survey database. The database dictionary for the POTW survey identifies the database codes developed for this project, and is located in the MP&M Administrative Record. EPA contacted more than 95 POTW survey respondents by telephone to clarify incomplete or inconsistent information prior to data entry.

The Agency developed a database for the information provided by survey respondents. After review and coding, EPA entered data from 147 POTW surveys into the database using a double key-entry and verification procedure. The database dictionary presents the database structure and defines each field in the files for the POTW survey database.

3.2 Site Visits

The Agency visited 201 MP&M sites between 1986 and 1999 to collect information about MP&M unit operations, water use practices, pollution prevention and treatment technologies, and waste disposal methods, and to evaluate sites for potential inclusion in the MP&M sampling program (described in Section 3.3). In general, the Agency visited sites to encompass the range of sectors, unit operations, and wastewater treatment technologies within the MP&M industry (discussed in Section 3.2.1). Table 3-3 lists the number of sites visited within each MP&M sector. The total number of site visits presented in this table exceeds 201 because EPA classified some sites in multiple sectors. Figure 3-2 presents the number of MP&M sites visited and sampled by industrial sector.

Table 3-3
Number of Sites Visited Within Each MP&M Sector

Industrial Sectors	Total Number of Sites Visited	Industrial Sectors	Total Number of Sites Visited
Aerospace	13	Motor Vehicle	20
Aircraft	32	Office Machines	5
Bus and Truck	8	Ordnance	15
Electronic Equipment	22	Precious Metals and Jewelry	2
Hardware	15	Printed Wire Boards	9
Household Equipment	4	Railroad	10
Instrument	4	Ships and Boats	7
Job Shops	20	Stationary Industrial Equipment	14
Mobile Industrial Equipment	7	Miscellaneous Metal Products	0

Source: MP&M Site Visits.

3.2.1 **Criteria for Site Selection**

The Agency based site selection on information contained in the MP&M screener and detailed surveys. The Agency also contacted regional EPA personnel, state environmental agency personnel, and local pretreatment coordinators to identify MP&M sites believed to be operating in-process source reduction and recycling technologies and/or well-operated end-of-pipe wastewater treatment technologies.

The Agency used the following four general criteria to select sites that encompassed the range of sectors and unit operations within the MP&M industry.

1. The site performed MP&M unit operations in one of the industrial sectors. To assess the variation of unit operations and water use practices across sectors, the Agency visited sites in each of the MP&M sectors.

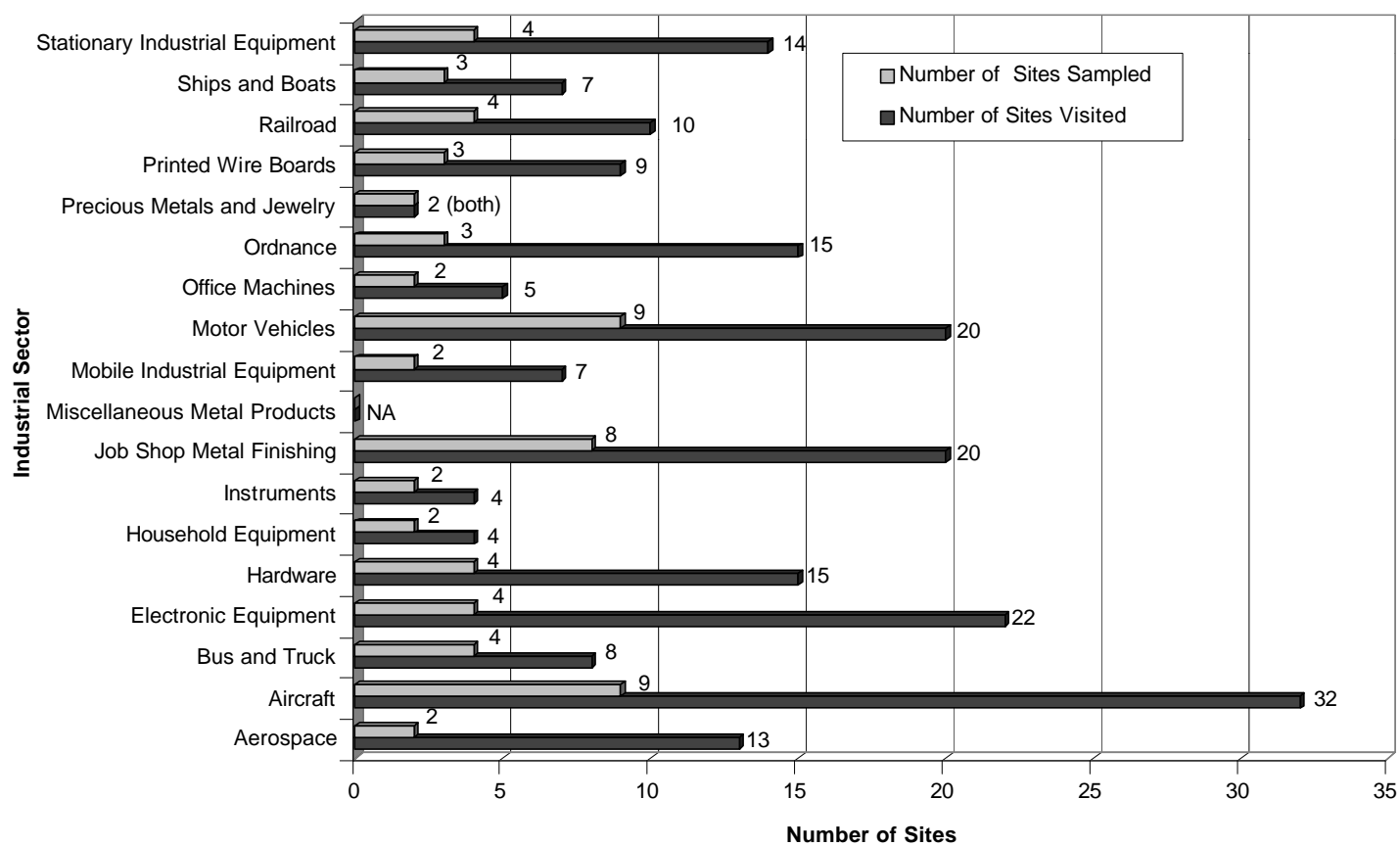


Figure 3-2. Number of MP&M Sites Visited and Sampled by Industrial Sector

2. The site performed MP&M unit operations that needed to be characterized for development of the regulation.
3. The site had water use practices that were believed to be representative of the best sites within an industrial sector.
4. The site operated in-process source reduction, recycling, or end-of-pipe treatment technologies EPA was evaluating in developing the MP&M technology options.

The Agency also attempted to visit sites of various sizes. EPA visited sites with wastewater flows ranging from less than 200 gpd to more than 1,000,000 gpd.

Site-specific selection criteria are discussed in site visit reports (SVRs) prepared for each site visited by EPA. The SVRs are located in the MP&M Administrative Record.

3.2.2 Information Collected

During the site visits, EPA collected the following types of information:

- C Unit operations performed at the site and the types of metals processed through these operations;
- C Purpose of unit operations performed and purpose for any process water and chemical additions used by the unit operations;
- C Types and disposition of wastewater generated at the site;
- C Types of in-process source reduction and recycling technologies performed at the site;
- C Cross-media impacts of in-process source reduction and recycling technologies;
- C Types of end-of-pipe treatment technologies performed at the site; and
- C Logistical information required for sampling.

This information is documented in the SVRs for each site. Non-confidential SVRs can be found in the MP&M Public Record.

3.3 Wastewater and Solid Waste Sampling

The Agency conducted sampling episodes at 72 sites between 1986 and 1999 to obtain data on the characteristics of MP&M wastewater and solid wastes. In addition, EPA

performed sampling episodes to assess the following: the loading of pollutants to surface waters and POTWs from MP&M sites; the effectiveness of technologies designed to reduce and remove pollutants from MP&M wastewater; and the variation of MP&M wastewater characteristics across unit operations, metal types processed in each unit operation, and sectors. Table 3-4 indicates the number of sites sampled within each MP&M sector. The number of sampled sites presented in the table does not equal 72 because EPA conducted multiple sampling episodes at some sites, and EPA classified some sites in multiple sectors. Figure 3-2 on page 3-27 presents the number of sites visited and sampled by industrial sector.

Table 3-4

Number of Sites Sampled Within Each MP&M Sector

Industrial Sectors	Total Number of Sites Sampled	Industrial Sectors	Total Number of Sites Sampled
Aerospace	2	Motor Vehicle	9
Aircraft	9	Office Machines	2
Bus and Truck	4	Ordnance	3
Electronic Equipment	4	Precious Metals and Jewelry	2
Hardware	4	Printed Wiring Boards	3
Household Equipment	2	Railroad	4
Instruments	2	Ships and Boats	3
Job Shops	8	Stationary Industrial Equipment	4
Mobile Industrial Equipment	2	Miscellaneous Metal Products	0

Source: MP&M Sampling Episodes.

3.3.1 Criteria for Site Selection

The Agency used information collected during MP&M site visits to identify candidate sites for sampling. The Agency used the following general criteria to select sites for sampling:

- C The site performed MP&M unit operations EPA was evaluating for development of the MP&M regulation;
- C The site processed metals through MP&M unit operations for which the metal type/unit operation combination needed to be characterized for the sampling database;
- C The site performed in-process source reduction, recycling, or end-of-pipe treatment technologies that EPA was evaluating for technology option development; and

- C The site performed unit operations in a sector that EPA was evaluating for development of the MP&M regulation.

The Agency also attempted to sample at sites of various sizes. EPA sampled at sites with wastewater flows ranging from less than 200 gpd to more than 1,000,000 gpd.

After EPA selected a site for sampling, the Agency prepared a detailed sampling and analysis plan (SAP), based on the information contained in the SVR and follow-up correspondence with the site. EPA prepared the SAPs to ensure collection of samples that would be representative of the sampled waste streams. The SAPs contained the following types of information: site-specific selection criteria for sampling; information about site operations; sampling point locations and sample collection, preservation, and transportation procedures; site contacts; and sampling schedules.

3.3.2 Information Collected

In addition to wastewater and solid waste samples, the Agency collected the following types of information during each sampling episode:

- C Dates and times of sample collection;
- C Flow data corresponding to each sample;
- C Production data corresponding to each sample of wastewater from MP&M unit operations;
- C Design and operating parameters for source reduction, recycling, and treatment technologies characterized during sampling;
- C Information about site operations that had changed since the site visit or that were not included in the SVR; and
- C Temperature and pH of the sampled waste streams.

EPA documented all data collected during sampling episodes in the sampling episode report (SER) for each sampled site. Nonconfidential SERs are located in the MP&M Public Record. Many of the SERs also contain preliminary technical analyses of treatment system performance (where applicable) as compared to treatment performance data collected for previous metals industry regulatory development efforts.

3.3.3 Sample Collection and Analysis

The Agency collected, preserved, and transported all samples according to EPA protocols as specified in EPA's Sampling and Analysis Procedures for Screening of Industrial

Effluents for Priority Pollutants (1) and the MP&M Quality Assurance Project Plan (QAPP). These documents are located in the MP&M Administrative Record.

In general, EPA collected composite samples from wastewater streams with compositions that the Agency expected to vary over the course of a production period (e.g., overflowing rinse waters, wastewater from continuous recycling and treatment systems). The Agency collected grab samples from unit operation baths or rinses that the facility did not continuously discharge and the Agency did not expect to vary over the course of a production period. EPA also collected composite samples of wastewater treatment sludge at 11 facilities. EPA collected the required types of quality control samples as described in the MP&M QAPP, such as blanks and duplicate samples, to verify the precision and accuracy of sample analyses.

The Agency shipped samples via overnight air transportation to EPA-approved laboratories, where the samples were analyzed for metal and organic pollutants and additional parameters (including several water quality parameters). EPA analyzed metal pollutants using EPA Method 1620 (2), volatile organic pollutants using EPA Method 1624 (3), and semivolatile organic pollutants using EPA Method 1625 (4). Tables 3-5 and 3-6 list the metal and organic pollutants, respectively, analyzed using these methods. Table 3-5 also lists additional metal pollutants that EPA analyzed in the MP&M sampling program, but, as specified by EPA Method 1620, were not subject to the rigorous quality assurance/quality control procedures established by the QAPP. The Agency used these metals analyses for screening purposes and did not select the metals for regulation in this rulemaking (see Section 7.0). EPA analyzed additional parameters, including several water quality parameters, using analytical methods contained in EPA's Methods for Chemical Analysis of Water and Wastes (5). Table 3-7 lists these parameters, along with the method and technique used to analyze for each parameter. Method descriptions are included in the MP&M QAPP. The specific parameters measured in each sample are listed in the SER for each sampling episode.

Quality control measures used in performing all analyses complied with the guidelines specified in the analytical methods and in the MP&M QAPP. EPA reviewed all analytical data to ensure that these measures were followed and that the resulting data were within the QAPP-specified acceptance criteria for accuracy and precision.

As discussed previously, upon receipt and review of the analytical data for each site, EPA prepared an SER to document the data collected during sampling, the analytical results, and the technical analyses of the results. The SAPs and correspondence with site personnel are included as appendices to the SERs.

Table 3-5

**Metal Constituents Measured Under the MP&M Sampling Program
(EPA Method 1620)**

Metal Constituents		
ALUMINUM ANTIMONY ARSENIC BARIUM BERYLLIUM BORON CADMIUM CALCIUM CHROMIUM	COBALT COPPER IRON LEAD MAGNESIUM MANGANESE MERCURY MOLYBDENUM NICKEL	SELENIUM SILVER SODIUM THALLIUM TIN TITANIUM VANADIUM YTTRIUM ZINC
Additional Metal Constituents^a Not Subject to Rigorous QA/QC Procedures Per Method 1620		
BISMUTH CERIUM DYSPROSIUM ERBIUM EUROPIUM GADOLINIUM GALLIUM GERMANIUM GOLD HAFNIUM HOLMIUM INDIUM IODINE IRIDIUM	LANTHANUM LITHIUM LUTETIUM NEODYMIUM NIOBIUM OSMIUM PALLADIUM PHOSPHORUS PLATINUM POTASSIUM PRASEODYMIUM RHENIUM RHODIUM RUTHENIUM	SAMARIUM SCANDIUM SILICON STRONTIUM SULFUR TANTALUM TELLURIUM TERBIUM THORIUM THULIUM TUNGSTEN URANIUM YTTERBIUM ZIRCONIUM

^aAnalyses for these metals were used for screening purposes, and the metals were not selected for regulation in this rulemaking.

Source: EPA Method 1620.

Table 3-6

**Organic Constituents Measured Under the MP&M Sampling Program
(EPA Methods 1624 and 1625)**

Volatile Organic Constituents (EPA Method 1624)	
ACRYLONITRILE	TRANS-1,4-DICHLORO-2-BUTENE
BENZENE	TRIBROMOMETHANE
BROMODICHLOROMETHANE	TRICHLOROETHENE
BROMOMETHANE	TRICHLOROFLUOROMETHANE
CARBON DISULFIDE	VINYL ACETATE
CHLOROACETONITRILE	VINYL CHLORIDE
CHLOROBENZENE	1,1-DICHLOROETHANE
CHLOROETHANE	1,1-DICHLOROETHENE
CHLOROFORM	1,1,1-TRICHLOROETHANE
CHLOROMETHANE	1,1,1,2-TETRACHLOROETHANE
CIS-1,3-DICHLOROPROPENE	1,1,2-TRICHLOROETHANE
CROTONALDEHYDE	1,1,2,2-TETRACHLOROETHANE
DIBROMOCHLOROMETHANE	1,2-DIBROMOETHANE
DIBROMOMETHANE	1,2-DICHLOROETHANE
DIETHYL ETHER	1,2-DICHLOROPROPANE
ETHYL CYANIDE	1,2,3-TRICHLOROPROPANE
ETHYL METHACRYLATE	1,3-BUTADIENE, 2-CHLORO
ETHYLBENZENE	1,3-DICHLOROPROPANE
IODOMETHANE	1,4-DIOXANE
ISOBUTYL ALCOHOL	2-BUTANONE
M-XYLENE	2-CHLOROETHYL VINYL ETHER
METHYL METHACRYLATE	2-HEXANONE
METHYLENE CHLORIDE	2-PROPANONE
O+P-XYLENE	2-PROPEN-1-OL
TETRACHLOROETHENE	2-PROPENAL
TETRACHLOROMETHANE	2-PROPENENITRILE, 2-METHYL-
TOLUENE	3-CHLOROPROPENE
TRANS-1,2-DICHLOROETHENE	4-METHYL-2-PENTANONE
TRANS-1,3-DICHLOROPROPENE	
Semivolatile Organic Constituents (EPA Method 1625)	
ACENAPHTHENE	BENZO(A)ANTHRACENE
ACENAPHTHYLENE	BENZO(A)PYRENE
ACETOPHENONE	BENZO(B)FLUORANTHENE
ALPHA-TERPINEOL	BENZO(GHI)PERYLENE
ANILINE	BENZO(K)FLUORANTHENE
ANILINE, 2,4,5-TRIMETHYL-	BENZOIC ACID
ANTHRACENE	BENZONITRILE, 3,5-DIBROMO-4-HYDROXY-
ARAMITE	BENZYL ALCOHOL
BENZANTHRONE	BETA-NAPHTHYLAMINE
BENZENETHIOL	BIPHENYL

Table 3-6 (Continued)

Semivolatile Organic Constituents (EPA Method 1625)	
BENZIDINE	BIPHENYL, 4-NITRO
BIS(2-CHLOROETHOXY)METHANE	N-EICOSANE
BIS(2-CHLOROETHYL) ETHER	N-HEXACOSANE
BIS(2-CHLOROISOPROPYL) ETHER	N-HEXADECANE
BIS(2-ETHYLHEXYL) PHTHALATE	N-NITROSODI-N-BUTYLAMINE
BUTYL BENZYL PHTHALATE	N-NITROSODIETHYLAMINE
CARBAZOLE	N-NITROSODIMETHYLAMINE
CHRYSENE	N-NITROSODIPHENYLAMINE
CIODRIN	N-NITROSOMETHYLETHYLAMINE
CROTOXYPHOS	N-NITROSOMETHYLPHENYLAMINE
DI-N-BUTYL PHTHALATE	N-NITROSOMORPHOLINE
DI-N-OCTYL PHTHALATE	N-NITROSOPIPERIDINE
DI-N-PROPYLNITROSAMINE	N-OCTACOSANE
DIBENZO(A,H)ANTHRACENE	N-OCTADECANE
DIBENZOFURAN	N-TETRACOSANE
DIBENZOTHIOPHENE	N-TETRADECANE
DIETHYL PHTHALATE	N-TRIACONTANE
DIMETHYL PHTHALATE	N,N-DIMETHYLFORMAMIDE
DIMETHYL SULFONE	NAPHTHALENE
DIPHENYL ETHER	NITROBENZENE
DIPHENYLAMINE	O-ANISIDINE
DIPHENYLDISULFIDE	O-CRESOL
ETHANE, PENTACHLORO-	O-TOLUIDINE
ETHYL METHANESULFONATE	O-TOLUIDINE, 5-CHLORO-
ETHYLENETHIOUREA	P-CHLOROANILINE
FLUORANTHENE	P-CRESOL
FLUORENE	P-CYMENE
HEXACHLOROBENZENE	P-DIMETHYLAMINOAZOBENZENE
HEXACHLOROBUTADIENE	P-NITROANILINE
HEXACHLOROCYCLOPENTADIENE	PENTACHLOROBENZENE
HEXACHLOROETHANE	PENTACHLOROPHENOL
HEXACHLOROPROPENE	PENTAMETHYLBENZENE
HEXANOIC ACID	PERYLENE
INDENO(1,2,3-CD)PYRENE	PHENACETIN
ISOPHORONE	PHENANTHRENE
ISOSAFROLE	PHENOL
LONGIFOLENE	PHENOL, 2-METHYL-4,6-DINITRO-
MALACHITE GREEN	PHENOTHIAZINE
MESTRANOL	PRONAMIDE
METHAPYRILENE	PYRENE
METHYL METHANESULFONATE	PYRIDINE
N-DECANE	RESORCINOL
N-DOCOSANE	SAFROLE
N-DODECANE	SQUALENE
STYRENE	2-NITROANILINE
THIANAPHTHENE	2-NITROPHENOL
THIOACETAMIDE	2-PHENYLNAPHTHALENE
THIOXANTHE-9-ONE	2-PICOLINE
TOLUENE, 2,4-DIAMINO-	2,3-BENZOFUORENE

Table 3-6 (Continued)

Semivolatile Organic Constituents (EPA Method 1625)	
1-BROMO-2-CHLOROBENZENE	2,3,4,6-TETRACHLOROPHENOL
1-BROMO-3-CHLOROBENZENE	2,3,6-TRICHLOROPHENOL
1-CHLORO-3-NITROBENZENE	2,4 -DICHLOROPHENOL
1-METHYLFLUORENE	2,4-DIMETHYLPHENOL
1-METHYLPHENANTHRENE	2,4-DINITROPHENOL
1-NAPHTHYLAMINE	2,4-DINITROTOLUENE
1-PHENYLNAPHTHALENE	2,4,5-TRICHLOROPHENOL
1,2-DIBROMO-3-CHLOROPROPANE	2,4,6-TRICHLOROPHENOL
1,2-DICHLOROBENZENE	2,6-DI-TERT-BUTYL-P-BENZOQUINONE
1,2-DIPHENYLHYDRAZINE	2,6-DICHLORO-4-NITROANILINE
1,2,3-TRICHLOROBENZENE	2,6-DICHLOROPHENOL
1,2,3-TRIMETHOXYBENZENE	2,6-DINITROTOLUENE
1,2,4-TRICHLOROBENZENE	3-METHYLCHOLANTHRENE
1,2,4,5-TETRACHLOROBENZENE	3-NITROANILINE
1,2:3,4-DIEPOXYBUTANE	3,3'-DICHLOROBENZIDINE
1,3-DICHLORO-2-PROPANOL	3,3'-DIMETHOXYBENZIDINE
1,3-DICHLOROBENZENE	3,6-DIMETHYLPHENANTHRENE
1,3,5-TRITHIANE	4-AMINOBIPHENYL
1,4-DICHLOROBENZENE	4-BROMOPHENYL PHENYL ETHER
1,4-DINITROBENZENE	4-CHLORO-2-NITROANILINE
1,4-NAPHTHOQUINONE	4-CHLORO-3-METHYLPHENOL
1,5-NAPHTHALENEDIAMINE	4-CHLOROPHENYL PHENYL ETHER
2-(METHYLTHIO)BENZOTHAZOLE	4-NITROPHENOL
2-CHLORONAPHTHALENE	4,4'-METHYLENEBIS(2-CHLOROANILINE)
2-CHLOROPHENOL	4,5-METHYLENE PHENANTHRENE
2-ISOPROPYLNAPHTHALENE	5-NITRO-O-TOLUIDINE
2-METHYLBENZOTHIOAZOLE	7,12-DIMETHYLBENZ(A)ANTHRACENE
2-METHYLNAPHTHALENE	

Source: EPA Methods 1624 and 1625.

Table 3-7**Additional Parameters Measured Under the MP&M Sampling Program**

Parameter	EPA Method
Acidity	305.1
Alkalinity	310.1
Ammonia as Nitrogen	350.1
BOD 5-Day (Carbonaceous)	405.1
Chemical Oxygen Demand (COD)	410.1 410.2
Chloride	325.3
Cyanide, Total	335.2
Cyanide, Amenable	335.1
Fluoride	340.2
Nitrogen, Total Kjeldahl	351.2
Oil and Grease	413.2
Oil and Grease (as HEM)	1664
pH	150.1
Phenolics, Total Recoverable	420.2
Phosphorus, Total	365.4
Sulfate	375.4
Sulfide, Total	376.1, 376.2
Total Dissolved Solids (TDS)	160.1
Total Organic Carbon (TOC)	415.1
Total Petroleum Hydrocarbons (as SGT-HEM)	1664
Total Suspended Solids (TSS)	160.2
Ziram	630.1

Source: EPA Methods for Chemical Analysis of Water and Wastes.

3.4 Other Sampling Data

Extension of the MP&M effluent guidelines schedule, as discussed in Section 2.2, allowed more stakeholder involvement for data collection. The Association of American Railroads (AAR), the Hampton Roads Sanitation District (HRSD), and the Los Angeles County Sanitation Districts (LACSD) proposed potential sampling sites to the Agency, and EPA visited these sites to identify candidates for sampling. After conducting site visits, EPA selected five sites for sampling episodes.

EPA selected the five sites to characterize end-of-pipe treatment technologies in metal finishing and aircraft parts job shops and the railroad and shipbuilding industrial sectors. The site sampled by AAR performs railroad line maintenance and uses dissolved air flotation (DAF) to treat MP&M process wastewater. The site sampled by HRSD manufactures ships and boats and uses DAF, chemical precipitation, and cyanide destruction to treat process wastewater. The three sites sampled by LACSD were two metal finishing job shops and one aircraft parts manufacturing job shop. EPA selected the LACSD sites to provide data for cyanide treatment and also conducted effluent variability sampling at one of the metal finishing job shops.

EPA prepared detailed SAPs based on the information collected during the five site visits, and AAR, HRSD and LACSD collected the wastewater samples. EPA also prepared the sampling episode reports. In addition to the wastewater samples, sampling personnel obtained the collection date and time, sample flow data, treatment unit design and operating parameters, and temperature and pH of the sampled waste streams. All data collected during sampling episodes are documented in the SER for each sampled site which are located in the MP&M Administrative Record. The SERs also contain preliminary technical analyses of treatment system performance (where applicable) as compared to treatment performance data collected for previous metals industry regulatory development efforts. EPA combined these data with data collected from the MP&M sampling program.

EPA collected, preserved, and transported all samples according to EPA protocols as specified in EPA's Sampling and Analysis Procedures for Screening of Industrial Effluents for Priority Pollutants and the MP&M QAPP. Shipping and analysis of the samples were similar to that discussed in Section 3.3 with the exception that some samples were shipped directly to internal sanitation district laboratories for analysis. Pollutant parameters and analytical methods were agreed upon by EPA, AAR, HRSD, and LACSD and were treated as equivalent to the EPA MP&M sampling program.

3.5 Other Industry-Supplied Data

EPA evaluated other industry data in developing the MP&M effluent guidelines. The data sources reviewed included public comments to the 1995 MP&M Phase I proposed rule, the Metal Finishing F006 Benchmark Study (8), data supporting the Final Rule for the F006 Accumulation Time Extension (65 FR 12377, March 8, 2000), data provided by the Aluminum Anodizing Council (AAC), the American Wire Producers Association (AWPA), and the Aerospace Association. EPA also reviewed data from storm water pollution prevention plans

provided by several shipbuilding sites, dry dock data from a shipbuilding site, and data from periodic compliance monitoring reports/discharge monitoring reports for 14 sites that were part of the Agency's wastewater sampling program. Data submitted with the MP&M Phase I comments did not include the quality control data required to verify the accuracy of sample analyses and, therefore, EPA did not use the data.

3.6 Other Data Sources

In developing the MP&M effluent guidelines, EPA evaluated the following existing data sources:

1. EPA Engineering and Analysis Division (EAD) databases from development of effluent guidelines for Miscellaneous metals industries;
2. The Office of Research and Development (ORD) National Risk Management and Research Laboratory (NRMRL) treatability database;
3. The Fate of Priority Pollutants in Publicly Owned Treatment Works (50 POTW Study) database;
4. The Domestic Sewage Study; and
5. The Toxics Release Inventory (TRI) database.

These data sources and their uses for the development of the MP&M effluent guidelines are discussed below.

3.6.1 EPA/EAD Databases

As discussed in Section 2.0, EPA has promulgated effluent guidelines for 13 metals industries. In developing these past effluent guidelines, EPA collected wastewater samples to characterize the unit operations and treatment systems at sites in these industries. MP&M sites operate many of the same or similar sampled unit operations and treatment systems; therefore, EPA evaluated these data for transfer to the MP&M effluent guidelines development effort.

For the MP&M pollutant loading and wastewater characterization efforts, EPA reviewed the data collected for unit operations performed at both MP&M sites and at sites in the other metals industries. EPA reviewed the Technical Development Documents (TDDs), sampling episode reports, and supporting rulemaking record materials for the other metals industries to identify available data. EPA used these data for the preliminary assessment of the MP&M industry, but did not use these data for the MP&M pollutant loadings because EPA obtained sufficient data from the MP&M sampling program to characterize the MP&M unit operations.

For the MP&M technology effectiveness assessment effort, EPA reviewed sampling data collected to characterize treatment systems for the development of effluent

guidelines for Miscellaneous metals industries. For several previous effluent guidelines, EPA used treatment data from metals industries to develop the Combined Metals Database (CMDB), which served as the basis for developing limits for these industries. EPA also developed a separate database used as the basis for limits for the Metal Finishing category. EPA used the CMDB and Metal Finishing data as a guide in identifying well-designed and well-operated MP&M treatment systems. EPA did not use these data in developing the MP&M technology effectiveness concentrations, since the Agency collected sufficient data from MP&M sites to develop technology effectiveness concentrations.

3.6.2 Fate of Priority Pollutants in Publicly Owned Treatment Works Database

In September 1982, EPA published the Fate of Priority Pollutants in Publicly Owned Treatment Works (6), referred to as the 50 POTW Study. The purpose of this study was to generate, compile, and report data on the occurrence and fate of the 129 priority pollutants in 50 POTWs. The report presents all of the data collected, the results of preliminary evaluations of these data, and the results of calculations to determine the following:

- Ⓒ The quantity of priority pollutants in the influent to POTWs;
- Ⓒ The quantity of priority pollutants discharged from the POTWs;
- Ⓒ The quantity of priority pollutants in the effluent from intermediate process streams; and
- Ⓒ The quantity of priority pollutants in the POTW sludge streams.

EPA used the data from this study as one of the ways to assess removal by POTWs of MP&M pollutants of concern. To provide consistency for data analysis and establishment of removal efficiencies, EPA reviewed the 50-POTW Study and standardized the reported minimum levels of quantitation (MLs) for use in the MP&M proposed rule. EPA's review of the 50-POTW Study is described in more detail in Section 7.3.1, in the appendices to Section 7, and in memoranda located in Section 6.4 of the MP&M Public Record.

3.6.3 National Risk Management Research Laboratory (NRMRL) Treatability Database

EPA's Office of Research and Development (ORD) developed the NRMRL (formerly RREL) treatability database to provide data on the removal and destruction of chemicals in various types of media, including water, soil, debris, sludge, and sediment. This database contains treatability data from POTWs as well as industrial facilities for various pollutants. The database includes physical and chemical data for each pollutant, the types of treatment used to treat the specific pollutants, the types of wastewater treated, the size of the POTW or industrial plant, and the treatment concentrations achieved. EPA used the NRMRL database to estimate pollutant reductions achieved by POTWs for MP&M pollutants of concern that were not found in the 50-POTW database. The Agency used these percent removal estimates in calculating the pollutant

loads removed by indirect discharging MP&M facilities. Because the 50-POTW database contained sufficient data, EPA did not use these percent removal estimates in the pass-through analysis. EPA used only treatment technologies representative of typical POTW secondary treatment operations (i.e., activated sludge, activated sludge with filtration, aerated lagoons). The Agency further edited these files to include information pertaining only to domestic or industrial wastewater. The Agency used these percent removal estimates in calculating the pollutant loads removed by indirect discharging MP&M facilities. Because the 50-POTW database contained sufficient data, EPA did not use these percent removal estimates in the pass-through analysis. EPA used pilot-scale and full-scale data, and eliminated bench-scale data and data from less reliable references.

3.6.4 The Domestic Sewage Study

In February 1986, EPA issued the Report to Congress on the Discharge of Hazardous Wastes to Publicly Owned Treatment Works (7), referred to as the Domestic Sewage Study (DSS). This report, which was based in part on the 50 POTW Study, revealed a significant number of sites discharging pollutants to POTWs. These pollutants are a threat to the treatment capability of the POTW. These pollutants were not regulated by national effluent regulations. Some of the major sites identified were in the metals industries, particularly one called equipment manufacturing and assembly. This industry included sites that manufacture such products as office machines, household appliances, scientific equipment, and industrial machine tools and equipment. The DSS estimated that this category discharges 7,715 metric tons per year of priority hazardous organic pollutants, which are presently unregulated. Data on priority hazardous metals discharges were unavailable for this category. Further review of the DSS revealed Miscellaneous categories that were related to metals industries, namely the motor vehicle category, which includes servicing of new and used cars and engine and parts rebuilding, and the transportation services category, which includes railroad operations, truck service and repair, and aircraft servicing and repair. EPA used the information in the DSS in developing the 1989 Preliminary Data Summary (PDS) for the MP&M category.

3.6.5 Toxics Release Inventory (TRI) Database

The TRI database contains specific toxic chemical release and transfer information from manufacturing facilities throughout the United States. This database was established under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), which Congress passed to promote planning for chemical emergencies and to provide information to the public about the presence and release of toxic and hazardous chemicals. Each year, manufacturing facilities meeting certain activity thresholds must report the estimated releases and transfers of listed toxic chemicals to EPA and to the state or tribal entity in whose jurisdiction the facility is located. The TRI list includes more than 300 chemicals in 20 chemical categories.

EPA considered using the TRI database in developing the MP&M effluent guidelines. However, EPA did not use TRI data on wastewater discharges from MP&M sites because sufficient data were not available for effluent guidelines development. For example, in developing the MP&M effluent guidelines, EPA uses wastewater influent concentrations to

characterize a facility's wastewater and to calculate treatment efficiency (i.e., percent removal across the treatment system). The TRI database does not provide concentrations for the influent to a facility's treatment system. EPA also did not use the data on wastewater discharge because many MP&M sites do not meet the reporting thresholds for the TRI database.

3.7 References

1. U.S. Environmental Protection Agency. Sampling and Analysis Procedures for Screening of Industrial Effluents for Priority Pollutants, April 1977.
2. U.S. Environmental Protection Agency. Method 1620 Draft - Metals by Inductively Coupled Plasma Atomic Emission Spectroscopy and Atomic Absorption Spectroscopy, September 1989.
3. U.S. Environmental Protection Agency. Method 1624 Revision C - Volatile Organic Compounds by Isotope Dilution GCMS, June 1989.
4. U.S. Environmental Protection Agency. Method 1625 Revision C - Semivolatile Organic Compounds by Isotope Dilution GCMS, June 1989.
5. U.S. Environmental Protection Agency. Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Washington, DC, March 1979.
6. U.S. Environmental Protection Agency. Fate of Priority Pollutants in Publicly Owned Treatment Works, EPA 440/1-82/303, Washington, DC, September, 1982.
7. U.S. Environmental Protection Agency. Report to Congress on the Discharge of Hazardous Wastes to Publicly Owned Treatment Works, EPA 530-SW-86-004, Washington, DC, February 1986.
8. U.S. Environmental Protection Agency. Metal Finishing F006 Benchmark Study, Washington, DC, September 1998.